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Dear Paul,

In accordance with the requirements of referenced contract, we are pleased to submit this SM21 IT Planning Document for APS Demonstration Document (Task 3.7) for your review.

Your comments on this document are welcomed.

Regards,

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Strategic Mobility 21 Principal Investigator

cc: Administrative Contracting Officer (Transmittal Letter only)
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Strategic Mobility 21

IT Planning document for APS
Demonstration Document (Task 3.7)

Joint Force Pre-Deployment Training

An Initial Analysis and Product Definition

Prepared for:

Office of Naval Research

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This report updates an advanced Joint force pre-deployment training program “living design” first documented in 1995 and periodically updated over the past fifteen years. The report updates the design to fill the repeat and new training gaps identified during the recent Joint force deployment data collection events and Joint logistics studies. Since approximately 90 percent of all Army and Marine Corps equipment is transported by ships, the initial Joint force pre-deployment training program design emphasizes surface deployment procedures. To establish the initial training design, the surface movement procedures of the 3d Infantry Division (Mechanized), from the Fort Stewart, Georgia to the Port of Savannah were analyzed along with the Marine Corps deployment processes that are not associated with self deployment capabilities.The advanced computer based training program design is based on a service oriented architecture (SOA) to integrate a blend of commercial off-the-shelf learning applications, models and simulations, and additional web services to fill remaining training capability gaps.

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Abstract

Since the end of the Cold War, Joint force deployment has become an increasingly important capability for the Department of Defense (DOD). This is especially true for the Army, which is the only service not able to make transoceanic deployments using organic strategic lift assets. Today a greater percentage of the DOD Joint forces are home stationed within the United States than at any point during the Cold War, which requires longer deployment timelines and because of the Global War on Terror, more frequent deployments. This report documents the need to develop better pre-Joint deployment training capabilities to meet the training gaps that have been identified in studies and data collection efforts completed by members of the Strategic Mobility 21(SM21) team over the last fifteen years. The most recent SM21 deployment data collection completed in October 2007 and the Joint Logistics Education, Training and Exercise Study (JLETES) completed in 2009 for the Joint Forces Command (JFCOM) J7 document that the majority of the Joint deployment education and training gaps[1] identified in earlier studies still impact Joint force deployments.

Not long after the end of the Cold War and Operation Desert Storm, to meet the new deployment challenges, the Army, the most "land locked" service, established the Army Strategic Mobility Program (ASMP) in 1992. An important element of the ASMP was the Sealift Emergency Deployment Readiness Exercise (SEDRE) training program. SEDRE events were live deployments of a battalion size unit from the home location to the Seaport of Embarkation (POE) through loading on a strategic sealift ship. The SEDRE program was discontinued because of the high operational tempo caused by the Global War on Terror. However, recent studies and analysis confirm the need for better pre-Joint force deployment education and training.

This report updates an advanced Joint force pre-deployment training program "living design" first documented in 1995 and periodically updated over the past fifteen years. The report updates the design to fill the repeat and new training gaps identified during the recent Joint force deployment data collection events and Joint logistics studies. Since approximately 90 percent of all Army and Marine Corps equipment is transported by ships, the initial Joint force pre-deployment training program design emphasizes surface deployment procedures. To establish the initial training design, the surface movement procedures of the 3d Infantry Division (Mechanized), from the Fort Stewart, Georgia to the Port of Savannah were analyzed along with the Marine Corps deployment processes that are not associated with self deployment capabilities.

The advanced computer based training program design is based on a service oriented architecture (SOA) to integrate a blend of commercial off-the-shelf learning applications, models and simulations, and additional web services to fill remaining training capability gaps. The Strategic Mobility 21 - Joint Logistics Education and Training Experimentation Testbed (JLETT) will use this report to develop the most appropriate pre-deployment training program. The design will enable the appropriate integration of concepts and systems selected from the following: Blended Learning capabilities; Expert Knowledge Transformation techniques; Game-Based Learning; Instructional Systems; Modeling and Simulation systems; Performance Support Systems; Web 2.0 applications; emerging semantic web technologies; and Web-Based Training.

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[1] Enterprise Management Systems (EMS) completed the 2009, Joint Logistics Education, Training and Exercise Study (JLETES) for the Joint Forces Command (JFCOM) J7 and completed all data collection efforts cited. EMS is also the author of this report.

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Introduction

This technical document was designed to update and validate prior research conducted over the past fifteen years on computer based training (CBT). The overarching objective was to determine how effective CBT would be in improving Joint force deployment education and training. Live joint deployment training funding is limited and there is always pressure to reduce the deployment training budget even further. Funding and the general lack of focus on Joint logistics training at the Combatant Command level has created the need to determine the most effective pre-deployment training media, from a cost, usability, and readiness viewpoint, to enhance current Joint deployment capabilities.

Computer based training[2] represents a wide range of training methods from basic text presentation to high fidelity simulations. Additionally, just as verbal communication is only one of many methods for conveying meaning between individuals, there are many technologies and methods for training. No single method provides the most effective training solution. Combining several methodologies, based on the training requirements, is usually the best approach to learning (Heinen, 1996). Since individuals learn differently, blended learning appears to be the best solution. Blended learning is "the process of selecting instructional strategies and media that support different learning styles." Typically blended learning involves the development of virtual and physical resources. To accommodate the individual learning processes, it is important to consider the full range of training options that might integrate with CBT: visual, spatial, tactile, lock-step, discovery learning, active experimentation, and concrete experience (Gordon, 2010).

Beginning with the initial study and data collections in 1995, before training techniques were considered, the detailed training requirements (gaps) were identified and understood. To this end, the study considered not only deployment process engineering and computer science techniques but also instructional system design needs analyses. Once the Joint force deployment training requirements were understood, design and selection of the most appropriate training strategies for experimentation and development were considered. The training requirements identified over the past fifteen years were recently revalidated by a large scale deployment data collection effort completed in October, 2007[3] and the Joint Logistics Education, Training and Exercise Study (JLETES) completed in 2009 for the Joint Forces Command (JFCOM) J7. The following sections provide background information on the need for Joint force deployment training and present a proposed solution design.

The Importance of Joint Force Deployment Training

On August 2, 1990, President George H.W. Bush announced a change in deployment policy for the Armed Forces of the United States. The new policy would focus on preparing for regional conflicts "in whatever corner of the globe they occur." The Armed Forces would no longer focus on deterring a possible Soviet attack in Europe. The New World Order would require the Armed Forces to return to the continental United States and await future force deployment requirements. Ironically, on the very day of President Bush's policy announcement, Iraq invaded and occupied Kuwait and the United States began Operation Desert Shield (ODS). While on this

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[2] Virtual and Constructive

[3] The data collection effort took place during the deployment of the 4th Brigade, 3rd Infantry Division to Iraq.

day the United States crossed the threshold of a new military strategy, ODS exposed strategic mobility as a potential weak link in the force deployment chain (Vuono, 1991).

Even before the events leading to Operation Desert Shield, which lead to Operation Desert Storm, the collapse of the former Soviet Union had heightened force projection concerns. The concern was that without credible deployment capabilities, regional powers capable of threatening U.S. vital interests might feel free to do so. While Desert Storm was an overwhelming success for the allied and US Joint forces, the war confirmed that a force structure designed for the European War scenario lacked the mobility necessary to respond to these more diverse threats.

During the Cold War the military requirements were to execute containment of the Soviet Union. To accomplish this mission large standing forces, both nuclear and conventional were employed. By the end of the Cold War, the Army had more than four divisions based in Europe, 11 more in the United States. The tenets of flexible response to an invasion of Europe were served by nuclear arsenals and forward deployed forces. Rapid response to an invasion was primarily focused on the use of airlift to deploy light forces, and sealift movement of heavy combat units from the United States, while important, took a back seat.

Since the end of the Cold War, containment of the former Soviet Union first gave way to a national strategy aimed at preserving and promoting the ideals of democracy and free-market economies around the world; however, after the events of September 11, 2001, the Global War on Terror (GWOT) became the focus of Joint force deployment strategies. The result is that Joint forces must be prepared to deploy to and win a wide range of potential conflicts. DOD became concerned with potential deployments ranging from two simultaneous major regional contingencies through Complex Humanitarian Disaster responses, such as the Haiti earthquake response during January 2010.

The current national strategy and deployment demands both increased reliance on strategic mobility and, because of the current commitments in Iraq and Afghanistan, the ability to conduct the full life cycle of Joint force employment: deployment, redeployment, retrograde, reset followed by another full cycle. Joint deployment training related to the use of military and commercial strategic mobility lift assets, software systems, and related functional and business processes must be a priority. Innovative training systems to train Joint force deployment planners and execution level personnel on the movement of Joint combat forces from home bases to the "fox hole" are required.

Scope of this Study

This report is intended to validate the concept that a "live" force projection training can be effectively enhanced using other training media to include computer based training (CBT) programs (constructive and virtual). The intent is to establish an initial Joint force training development concept for the Strategic Mobility 21 - Joint Logistics Education and Training Experimentation Testbed (SM21 JLETT) that will establish an effective training and education support program. All CBT techniques were considered for future SM21 JLETT experimentation including the use of commercial computer game technology. The baseline study, which was completed in 1997, was focused on the force deployment requirements of the 3rd Infantry Division (Mechanized) (3D ID). The 3D ID would be used as the baseline training target for the JLETT. The baseline data and lessons learned include a combination of 16 data collection efforts completed during both actual force deployments and the "live" force projection training that was initiated in 1992 after Operation Desert Storm and continued until shortly before the start of the GWOT. The live Army deployment training was known as a Sealift Emergency Deployment Readiness Exercise (SEDRE). During a SEDRE, an entire combat battalion was alerted, shipped to a seaport and loaded on an United States Naval Ship (USNS) designed for strategic deployment. While this training was effective, at the time, one exercise cost in excess of $1.2 million. The 3D ID baseline study was recently validated using data and information collected during the October 2007 force deployment of the 4th Brigade of the 3D ID.

Scope Statement

The scope statement was developed to provide a documented basis for confirming a common understanding of the project scope among the study stakeholders. The scope statement consists of the following three components: (1) Study Requirement and Objectives; (2) Approach to the Study; (3) Content of the Study.

Study Requirement and Objectives

Depending on live Joint force deployment training is not possible given the operational tempo since the start of the Global War on Terror. The alternative is a combination of training methods using live, virtual, and constructive environments with a focus on computer based training methods to train Joint deployment stakeholders. Recent actual deployments and previous SEDREs indicate a need for more command and control and procedural training. To solve the existing Joint Deployment training deficiencies, the Joint Forces Command J7 adopted the use an architecture that integrates LVC training as defined in the JFCOM J7 JLETES.

This living study concentrated over the years on establishing a combination of training methods with a focus on the use of commercial collaborative game techniques. This original design focus has recently been enhanced by evolution of Service Oriented Architectures (SOA). The current intent is to build a system that can be used for process and infrastructure evaluation along with Joint force deployment training. Ultimately, based on the SOA design of the SM21 Global Transportation Management System (GTMS) and the proposed training system, an integrated execution, planning, and training system is possible.

Approach to the Study

This study was based on the Joint force deployment planning requirements and the specific force projection requirements of the 3rd Infantry Division (Mechanized) stationed at Fort Stewart, and Hunter Army Airfield, Georgia. A combination of on-site and on-paper surveys of the deployment procedures, facilities, and routes used to deploy the 3D ID were conducted.

A complete review of past SEDRE After Action Reports (AAR) was conducted to assist in determining required learning objectives. AARs completed by the Department of Defense, Office of the Inspector General; 18th Airborne Corps; the Military Surface Deployment and Distribution Command (SDDC), Transportation Engineering Agency (TEA); and the Naval Sea Systems Command (NAVSEA) were reviewed.

The following figure summarizes the process used in this study. The elements of this process are explained more fully later sections of this report. It is important to note that this was an iterative process. During the course of the study it was often found that a completed step had to be re-examined to find answers for the current study step. As an example, the activity model development often required additional data not collected during the initial historical data collection and deployment procedure review. As a result, the work on the activity model was discontinued while additional data was gathered. After the required data was obtained, work on the activity model continued. This iterative activity, between the study process steps, continued throughout the study.

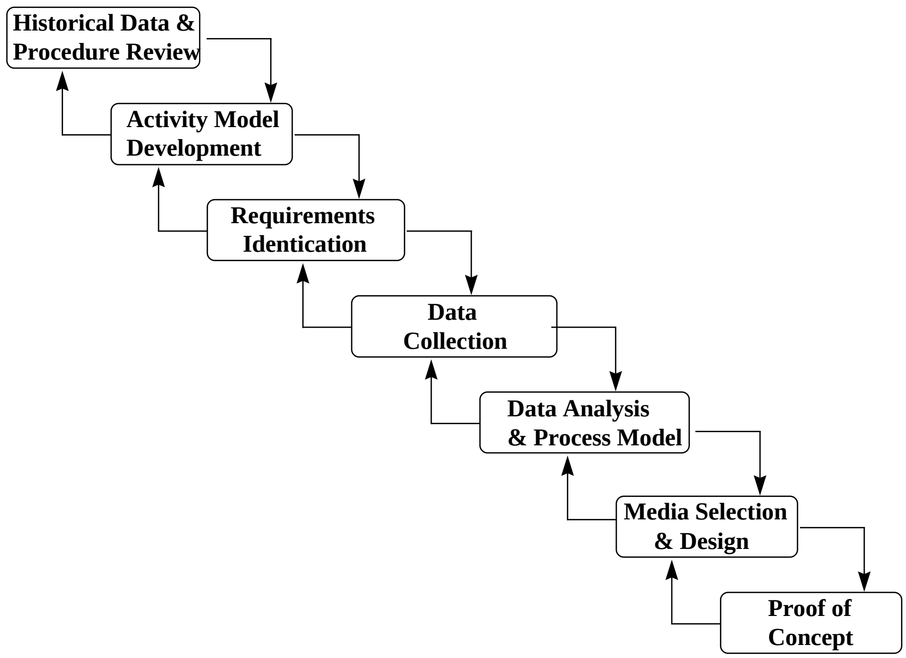


Figure 1: Research Process

Literature Review

The Deployment Training Requirement

There are five key deployment points required to ensure rapid and successful deployments that were highlighted as key fundamental learning objectives for SEDREs (Anderson, 1994):

- Understanding the overall deployment process.
- Identifying unit movement requirements.
- Ensuring load plans for vehicles and containers are developed, tested and followed.
- Reporting unit movement requirements on the automated unit equipment list.
- Maintaining supporting unit movement plans and standard operating procedures.

In addition to the points listed above, the overall Joint planning, command, coordination and control of the deployment and distribution process may be the most important aspects of the deployment process exercised during a SEDRE. This includes the critical elements of force validation after initial unit deployment planning and the subsequent lift nomination process, which are both a focus of JFCOM and USTRANSCOM.

Individual unit deployment training was not the only focus of the SEDRE program; installation infrastructure, ammunition depot loading capabilities, and the ASMP timelines were also tested and validated. The SDDC, which is responsible for coordination between the unit/installation level deployment stakeholders and the strategic port operators and manage terminal and ship loading in the United States, also participated in the exercises. From the initial SEDRE in October 1992, the exercises continued to expand by including a myriad of organizations throughout the defense and commercial transportation and logistics system. The exercises provided commanders, staff planners, and logistic personnel at all functional levels a valuable method to hone deployment related skills (Anderson, 1994). When the SEDRE program was terminated, the rapid, unannounced planning experience was lost. Current deployments are largely administrative with longer lead times to plan and coordination movements to Iraq and Afghanistan. However, the most recent observation of an actual force deployment to Iraq during October 2007 found that an ongoing training program is still needed.

The movement of the Army forces from Germany to Operation Desert Shield/Desert Storm was a good example of the importance of deployment training. The deployment of a forward deployed unit to a different theater of operation was not a common operation until the dual engagement scenario in Iraq and Afghanistan. The learning point is that the deployment of forces from Europe was never practiced during the Cold War. However, there are any number of Joint deployment scenarios of CONUS and forward deployed units that could occur and that are not supported by ongoing education and training. In the example case of the Army VII Corps deployment from Germany to the Middle East, the lack of deployment contingency planning and training led to many deployment delays (Brame, 1992).

To further compound the problem of Joint deployment training, the complexity of the deployment process creates a situation where one live training event is not enough. Every deployment of a Joint force can produce a different set of circumstances and the resultant time, cost, and commercial commerce impact. Different combinations of Joint forces, training levels and unit deployment experience, environmental conditions, distances, and military-commercial transport mix will result in a different deployment experience and outcome. The complexity and randomness of deployment operations cannot be fully appreciated without experiencing numerous deployments. Joint deployments as are considered to be highly complex, large in magnitude, requiring multi-modal transport, and reliant on time-phased dependencies (Bronson, 2000). An education and training program that provides Joint force deployment stakeholders all of the training opportunities they require to fully understand these complexities has never been fully established.

Lessons Learned

To simply conduct a live Joint deployment exercise or actual Joint deployment without capturing and analyzing all of the lessons learned for future review would be a vast waste of both time and resources. The complexity of deployment operations means that performance cannot be understood and measured by simple means. The answer to evaluating these training events is the After Action Review (AAR). The goals of an AAR are simple: learning and improving future performance. The AAR is a process that requires the participants to sit down with the training controller and discuss what happened during the training event. An effective AAR requires several things. There must be adequate knowledge of what occurred and unambiguous knowledge of what should have happened. Electronic data collection enables a high-fidelity recording of the training events. Training standards must be established and used to measure what should have happened (Sullivan, 1996). One of the two overarching recommendations of the JFCOM JLETES was: “Develop a joint logistics Advanced Knowledge Management System using a semantic web-based approach supported by a logistics-oriented ontology that would provide the reach-back capability to support joint logisticians whether stateside or forward deployed.” The development of a joint logistics AKMS would allow quick access to previous AAR for comparison

Any alternative training media should include AAR capability to determine what went wrong and what went right during the training. A computer based training program would be very capable of accurate collection of data relating to decisions made during force deployment training. The more challenging but necessary aspect is comparing what happened with what should have happened and presenting that information to the game player in a meaningful format.

Improved Approaches to Training or Snake Oil

There has been considerable debate since the mid-1980s on the best application and the resultant value of employing computer based training. Can CBT really make a significant positive impact on training effectiveness and cost? Many remain reluctant to embrace this technology because of past experiences with the hype over the educational use of radio, film strips, television, video technology, and web based distance learning programs.

It could be that the true potential of computer based training has not yet been realized. Most CBT applications completed prior to 1996 in the military, business, and public schools automated old learning processes. Enhancements to CBT applications continue to be made but like other software systems, they are often custom built resulting in initial development and long term system life cycle costs. The opportunity now exists to enable new learning approaches with a combination of commercial and military unique CBT applications. The rapid growth in the use of the Internet connections, local area networks, multimedia and collaborative software environments is energizing a new approach to training. This new growth is slowly creating new teaching techniques that are two-way, collaborative, interdisciplinary, and provided on demand. All of this makes the future of CBT very promising (Reinhardt, 1995).

The common need linking the military, schools, and corporations is the need to find ways to improve education’s return on investment. There is now significant evidence that proper use of technology can improve retention, reduce training boredom and in many cases reduce costs (Reinhardt, 1995).

Amy Virshup believed in 1997 that there really were two educational revolutions beginning. The first was about technological change and the second was the related shift to collaborative rather than individual work, which Educators call “active learning” since an individual performs a task in a “micro-world” instead of just reading or listening. Subjects sometimes are falsely divided because no book could possibly hold all of the information necessary to teach a complete process or concept. In the digital environment the walls between subjects can be dismantled and a micro-world developed (Virshup, 1997). The collaborative revolutions in education continue with the development and use of Web 2.0 technologies and the pending semantic web development.

While some in the education and training community continue to see computer based training as the next best thing since sliced bread, others see just another gimmick aimed at making more money for software developers. They liken the current hype about CBT to the film strip: Technologically great stuff but educationally empty. (Virshup, 1997).

In 1986 the Training Research Laboratory of the Army Research Institute for the Behavioral and Social Sciences published the results of their early study on the effectiveness of CBT. They examined approximately 150 papers on the subject and interviewed CBT professionals. The findings of the study was that consistent empirical evidence did not exist to support or deny claimed advantages of CBT over traditional teaching methods for (1) reducing training time; (2) reducing life-cycle costs; (3) achieving learning objectives; (4) accommodating learning differences, and; (5) motivating students to learn. The report did conclude that future generations of CBT could have significantly positive impact on students' cognitive process. The report concluded that CBT programs might be used to make current training programs more effective but CBT should not be used indiscriminately (Schlechter, 1986). Fast forward to 2010 and the Training Research Laboratory continues to report that distributed training tools for collaborative environments are not adequate. The laboratories web site reports that

> *"There is no effective capability for collaborative training with remote colleagues within the Army or across the Services. Emerging training, doctrine, and force structures advocate the need to rapidly deploy units with personnel who may be unfamiliar with each other. These units may include soldiers, members of other Services, and non-military personnel, whose assignments require electronic networking and collaboration with partners they have never met. Their missions may require specific-content training-on-demand along with the need to collaborate. The Army is funding the increased use of distributed learning technology to meet future training needs for a responsive and versatile Future Force, but there is little known about how to apply this technology to motivate learning through collaboration, such as distributed peer tutoring or multi-player online games."*

Given the continuing opinion of the Army Research Institute for the Behavioral and Social Sciences, there is an opportunity for the SM21 JLETT to develop a prototype Joint force pre-deployment collaborative training environment that properly applies this technology to motivate learning through collaboration. While it appears that most educators today see the value of CBT, this relatively new technology must be thoughtfully implemented. Overall, the impact of CBT has been limited because of skepticism, "technophobia," and poor CBT integration into "revised" curricula. A past study sponsored by Wright-Patterson Air Force Base concluded that proper integration of CBT in an educational setting requires a five-year integration plan (Medlin, 1997).

One can conclude from all of the current educational training literature and the experience of social networking employing Web 2.0 applications that CBT has strong potential to change the way we learn. But no one should believe that successful implementation of CBT programs is easy. Careful planning and implementation is a must to properly integrate this new learning method in the classroom and workplace.

The Way We Learn Decision Making.

There are two basic theories of how people make decisions. The oldest theory is that decision making is an analytical process based on the evaluation of numerous options, comparing them, and then choosing the best option. The second theory is that decision makers are more likely to rely on experience and intuition to establish a decision. Research shows that good decision makers rarely generate multiple options but instead are capable of developing a satisfactory first solution (Schmitt, 1996).

Analytical decision-making is seldom the process of choice during active military operations. Military decision making in the operational environment is a disorderly and time sensitive process. During the initial stages of most military deployments, uncertainty and ambiguity are pervasive characteristics. Military decision making is more a matter of creating a unique solution out of numerous unclear possibilities.

It was approximately thirty years ago that cognitive psychologists began to question the classical decision making model. In the 1970s serious studies were initiated on how experienced decision makers made decisions in "real life" situations. The phrase "naturalistic decision making" was eventually established to distinguish between this new approach to decision making theory and the classical approach. The classical approach studied decision making under controlled conditions - removing environmental and intangible factors. The new approach studies decision making under "naturalistic" conditions. This form of decision making focuses on the decision maker and how their expertise and experience is used in the field. The setting is of secondary nature, but is usually characterized by:

- Ill-structured, situation-unique problems
- Uncertain, dynamic environments
- Shifting, ill-defined or competing goals
- Lack of information
- Ongoing action with continuous feedback loops
- High level stress and friction
- Time stress

The research found that proficient decision makers use their intuition to recognize the essence of a given situation and to select an appropriate course of action. Separate studies by Dr. Gary Klein and others conclude that decision makers in a variety of fields use intuitive techniques for 90 percent of their decisions. Experienced decision makers tend to use intuitive decision making to an even greater extent. Inexperienced decision makers are more likely to use the analytical approach (although still not nearly as often as the intuitive method) (Lipshitz *et al*, 2001).

Experience is an essential factor for intuitive decision making. This is an extremely important point. Experience allows situation assessment which is the heart of intuitive decision making. Although each situation is unique, pervious experience allows the recognition of similarities or patterns and the understanding of what those patterns typically mean. With sufficient experience it is not necessary to reason through each plausible scenario in a situation (Lipshitz *et al*, 2001).

Intuitive decision-making is not always superior to analytical decision making. Each of the models has strengths and weaknesses. Effective decision making is based on knowing the most effective type of decision making for a given situation. The analytical approach to decision making offers advantages when (Schmitt, 1996):

- Time is not a factor and there is high computational complexity
- The decision-maker lacks experience
- It is necessary to justify a decision or to
- Resolve internal disagreements over a decision
- Choosing from among several clearly defined and documented options.

Teaching the analytical decision making process is a matter of teaching the "method." As an example, we would teach the step by step deployment process for the 3d ID. To teach the intuitive decision making process, we would be required to provide the target audience experience. Intuitive decision making is based on pattern recognition skills, and the only way to recognize those skills is through experience (Schmitt, 1996).

Can Computer Based Training Make Learning Fun?

Using computer technology for training can make learning fun and at the same time improve Joint force deployment skills. As Nolan Bushnell writes in the sub-title to a recent article he wrote: "Playing games can have serious consequences." The computer game industry has introduced many effective techniques to make learning easier and more enjoyable. Many of the more effective user interfaces were developed by the computer game industry. People, to put it mildly, hate to read instructions. Computer games are designed with a familiarization stage to aide new players in learning controls and techniques without the majority needing to refer to the manual (Smith, R. 8, 2007) The computer game industry learned early that if someone cannot learn the concept of a game in 15 seconds they will not invest another single quarter. The commercial computer industry also understands that instructions must be short and easy to understand (Bushnell, 1996). With the advancement of gaming technology, such as 3-D animation and the ability to play with others through the internet, gaming has transformed from a leisure activity to being a useful tool in industries such as the military and medicine (Smith, R. 15, 2007).[4]

Return-On-Investment

The "sales hype" on CBT has been rising steadily since the first introduction of CD-ROMS, CBT authorware, Web 2.0 applications, and now the promise of the semantic web. But what are the real returns on investment (ROI) that can be expected from the application of CBT? ROI cannot be discussed without acknowledging that the quality of the investment is as important as the quantity of the investment. Before any investment is made careful thought must be given to defining the real organizational problems that the CBT is aimed at correcting. There are two potential results of CBT applications: cost saving and performance improvement (Allen, 1996).

According to Andy Reinhardt "training on demand" is one new CBT technique that can be applied to reduce cost and answer the question of "how to keep the work force up to speed." Computers allow you to train someone new to a position that is hard or impossible to train someone for in real life. This is true of surgery and controlling complex processes like the

[4] When games and gaming technology are applied to professional industries, they are referred to as "serious games." (Smith, R. 15, 2007)

strategic deployment of military forces. All of these activities are expensive and carry a significant degree of risk.

Hewlett-Packard has been cited as one company that solved the problem of keeping their dispersed sales force trained about 15 years ago. In the process, the company was able to cut some of its sales training costs from $2 million to $200,000 per year. The companies solution was bring the training to the disbursed sales force via CBT and allow them to access the training when the need arose. Previously, the company sent a training staff to 12 different cities each quarter for a four to five week period (Reinhardt, 1995).

It appears that the most solid ROI data shows that CBT reduces required training time between 25 to 50 percent. An early study of CBT ROI completed in 1990 by the Institute for Defense Analysis (IDA) found an overall 31 percent time savings when CBT was compared to the traditional training methods. It is important to note that, while training time is reduced, there is no overall decrease in training effectiveness when CBT programs are employed. Compressing the training time has two consequences for ROI: (1) savings in wages and (2) savings in opportunity costs. Additionally, if CBT is properly implemented, travel costs for trainers are reduced or eliminated (Allen, 1996).

In addition to the reduced cost of training, a second ROI for CBT programs is improved performance. Most studies of CBT programs have found a 15 to 25 percent increase in learning achievement. Rex Allen, president of Allen Communication, provides four documented bottom-line results of CBT applications his company produced. The chairman of Union Pacific Railroad reported a 35 percent increase of on-time delivery. Omega Corporation found a 100 percent improvement in their sales force performance. The United Stated Air Force "reported an increase in the ability to diagnose and repair aircraft systems correctly the first time by more than 80 percent." American Express found a significant reduction in fraudulent claims because of a CBT application (Allen, 1996). This studies show that information learned in CBT programs transfers to real-world performance.

Computer Based Training Design Considerations

Rex Allen has suggested three ground rules for developing a CBT program. Because the primary business of CBT is teaching, the first rule is to conduct an in-depth analysis of the learners targeted. The program must be "fanatically audience-centered." Tests of CBT based Massive Multiplayer Gamers has shown that the more relevant the images are to the player the more likely that person is to retain and transfer what they have learned. Amy Alexander *et al* cited an example where even the color and looks of the uniform in one test made a difference. After analyzing the targeted audience, develop a conceptual outline of the program. Second, design a creative user interface. Many people have experienced and now expect "knock your socks off" graphics. The third step is to develop a sound implementation plan to include the following points:

- Gain support from all stakeholders
- Produce baseline measures of critical performance factors that are targeted for change. This baseline should be used to measure improvement
- Develop specifications and a maintenance program
- Calculate and communicate the ROI findings.

CBT Fidelity Requirements

The fidelity of the CBT program to the process or system being taught is a key development consideration. The fidelity of the program will impact both the cost and effectiveness of the program.

Fidelity can be described as "the degree of similarity between the training situation and the operational situation which is simulated. It is a two dimensional measurement of similarity in terms of (a) the physical characteristics and (b) the functional characteristics (Nigel and Walker, 1996)." A third form of fidelity is psychological fidelity. This reflects issues such as fear, stress and other psychological issues which could be experienced in an actual environment (Alexander *et al*, 2005).

The degree of fidelity in the physical, functional, and environmental areas must be carefully evaluated. The evaluation should be conducted to balance the need for a specific degree of fidelity with the cost of the development.

Summary of Literature

As determined during the literature review, there is a need to establish a strong deployment training program to ensure rapid Joint force deployments to meet the Combatant Commanders intent (operational requirements). Because of the characteristics of Joint combat unit deployments, Joint Combatant Commands, Supporting Commands, and deploying units and unit members must receive as much deployment training exposure as possible. The deployment process is best described as being highly complex, large in magnitude, random, multi-modal, and reliant on time-phased dependencies (Bronson, 2000). The only way to gain a full appreciation for the complexity of the deployment process is to experience numerous training or actual deployments. Decisions made during actual deployments must be timely and are often based on incomplete information. Those involved in the deployment decision process are not often afforded the luxury of collaborative, analytical decision making. Instead decisions must made by individuals based on their experience and intuition. However, because of the high cost, increasing the number of live deployment exercises to gain the needed experience becomes problematic.

While there are several alternatives to live deployment training, the literature review pointed strongly in the direction of some form of CBT program. However, a wide range of opinions exist on the effectiveness of CBT programs. Some educators and training specialists are reluctant to embrace CBT programs because of their past experience with the hype over the educational use of radio, film strips, television, video technology, and distance learning. Others see definite benefits in the use of CBT programs, especially in the areas of simulating real-world environments and collaborative learning. While many educators see significant value in using CBT programs, this new technology must be thoughtfully implemented.

As a final point, current literature is clear that before beginning any CBT program development, a thorough requirements definition must be completed. This requirements definition should include an in-depth analysis of the targeted user needs, a determination of the required fidelity of the CBT program with the "real world," establishment of the type of graphical user interface to be employed, and development of a complete implementation plan.

Methodology used in the study

General

To evaluate the need for an alternative deployment training media, a specific methodology was established. This methodology included an evaluation of the effectiveness of the current training program. The initial Joint deployment CBT analysis was centered on the 3D ID because of its important strategic deployment mission, the maturity of the deployment process established by the unit, and the dependence on the Joint community of the unit and Army in general for force deployments. While the focus was on a specific Army unit, Marine Corps deployment requirements were evaluated for future integration. The methodology used included historical data reviews; macro and micro data collection and analysis; regulation and procedure reviews; and development of both an activity and process model. Additionally, a media selection model developed by the Southwest Research Institute was employed. The analysis process, depicted as a stepped process, is included in Figure 1.

Historical Data Review

The Operation Desert Shield (ODS) deployment beginning August 7, 1990 was the first full scale combat deployment of the 3D ID in over 40 years. The lessons learned from this deployment provided a good historical baseline to measure the effectiveness of the SEDRE training program initiated in 1992. The effectiveness of the current training program was measured by reviewing and comparing the historical data and the results of SEDRE training events conducted since 1992.

The data sources gathered and reviewed include: Army After Action Reports for recent deployments and SEDREs; Military SDDC-TEA ship load time data; port and fort transportation capability simulation design documents; DOD Inspector General ship loading data analysis; and ship load performance reports from the Navy's David Taylor Research Center. Additionally, all Joint Publications, Service Publications, SDDC-TEA assessments, 3D ID Regulations and reports, and FORSCOM Regulations, References, and Planning Guidance Pamphlets were obtained and reviewed.

To gather detailed process data associated with the ODS deployment and early SEDRE exercises, visits were made to the following organizations:

1. XVIIIth Airborne Corps Emergency Deployment Readiness Exercise Division, Ft. Bragg, North Carolina
2. 3rd Infantry Division (Mechanized), Fort Stewart, Georgia
3. Port of Savannah, Savannah, Georgia
4. SDDC, Transportation Engineering Agency, the located in Newport News, Virginia
5. U.S. Army Transportation School, Fort Eustis, Virginia
6. 1179th Deployment Support Brigade, Brooklyn, New York
7. Dragon Team 4-97 Sealift Emergency Deployment Readiness Exercise, Fort Stewart and Savannah, Georgia

The information gained during the data collection process was then used in the development of the initial activity model, process model, and the proposed CBT design. The Activity Model has been updated but requires additional documentation and analysis by the SM21 JLETT after the organization is fully established.

Review of After Action Reports

After Action Reports, from both Iraqi War deployments, the Sealift Emergency Readiness Exercises conducted since 1992, and the more recent deployment of the 4th Brigade, 3ID to Iraq during late 2007 were reviewed as a part of this study to determine what trends in performance could be identified. Negative trends were identified to use as a basis for developing priority learning objectives for computer based training. The lessons learned contained in After Action Reports are summarized in Appendix A. A summary table of the AAR analysis is presented in later sections.

Activity Model Development

To establish the fort to port deployment process, an Integration Definition for Function Modeling (IDEF0 (Activity Model)) was developed. IDEF0 activity models are designed to provide a means for completely and consistently modeling the functions (activities, actions, processes, and operations) required by a system. The activity model was based on the Federal Information Processing Standard Publication 183, Integration Definition for Function Modeling (IDEF0).

The IDEF0 model was documented using an independent Computer-Aided Software Engineering (CASE) tool - Bpwin. The completed IDEF0 activity model is available for review. It will require updating to reflect a more Joint force deployment centric environment.

Process Model Development

A detailed fort to port process model was developed using data collected during the on-site visits and data reviews. The process model is intended for use in developing the computer code necessary for a CBT program. The model was developed in such a manner to allow its use for any fort to port application. To accommodate this versatility, the model is designed to allow the development of a data driven computer code. This means that instead of “hard coding” each CBT program for a specific fort to port application, the basic code can be adapted for use by any Army unit. The process model was used as the basis for the detail CBT program design.

Training Media Selection Process

During on-site data collection events conducted during this study, one issue that continually surfaced was the concern over the total elimination of the current SEDRE training program. Computer based training represents a wide range of training methods from basic text presentation to high fidelity simulations, and this fact tends to create confusion and fear. The prevalent question became - will the computer training program be used to replace the current SEDRE, and, if so, will it “make the grade?”

Just as verbal communication is only one of many methods for conveying meaning between individuals, there are many technologies and methods for training. No single method provides the most effective training solution. Therefore, in this study, a combination of several methodologies, based on the training requirements, were examined to determine the best approach to deployment training. The use of multiple training methods was considered throughout the study.

To determine the best alternative training media available to use, in addition to live Sea Emergency Deployment Readiness Exercises, a media selection model was employed. The model selected was developed by Southwest Research Institute (SwRI). SwRI is an independent, nonprofit, applied engineering and physical sciences research and development organization dedicated to technology development and transfer. The model developed by SwRI is named the Automated Media Selection Model. It is currently a Beta Version 1 model. This particular media selection model was developed to assist training specialists in choosing an appropriate delivery media for training needs, based on three factors: (1) type of learning, (2) type of student, and (3) resources available and other factors.

Once the Army's deployment training requirements were understood, design and selection of the most appropriate training strategy was made. The selection considered the following technologies: real-time simulation software, 3-D graphics, human computer interface methods, digital multimedia, speech recognition, networked or distributed interactive simulation methods including the Internet, instructor-led materials, text-based workbooks, computer-based instruction, modeling and visualization of the deployment process, and virtual environments. Each of these instructional delivery techniques were considered either in the final design process or during the media selection process.

Return-On-Investment

The potential return on investment from the development of an alternative training delivery media could not be fully developed during this initial study. At this point the extent of the program development is not known nor is the full impact of employing CBT. However, basic calculations were completed to provide a cost benefit estimate. This estimate was based on the full development of a fort to port CBT for the 3D ID.

Study Findings

Study and After Action Report Review Findings

As a result of reviewing current Joint force deployment education and training studies along with the more detailed After Action Reports related to the deployment of the 3D ID, repetitive areas of concern were recorded.

Joint Deployment Guidance to Deployment Training Analysis

The Joint Deployment Guidance to Deployment Training Analysis study was prepared for USJFCOM J-9 by LMI in June 2008. It should be noted that this study was not officially released and therefore not considered an official study at the time this report was written. However, the LMI report contains valuable insight into the requirements of Joint force deployment education and training. The following analysis was extracted from the Enterprise Management Systems review of Joint Logistics Studies documented in the Joint Logistics Education, Training, and Exercise Study (JLETES).

The Joint Deployment Guidance to Deployment Training Analysis study was initiated to support the Joint Requirements Oversight Council's Memorandum (JROCM) 042-05, "Operation IRAQI FREEDOM (OIF) Lessons Learned (LL) – Deployment Planning and Execution," which tasked USJFCOM to "develop (a) near- and long-term plan to incorporate deployment planning and execution training and education in partnership with combatant command exercises worldwide." During this study fifty-one joint and Service training courses were reviewed, deployment doctrine was reviewed, and feedback was solicited from subject matter experts. There were two overarching findings and recommendations. First, there is no single source for standardization of deployment training across joint and Service training organizations. The study recommended that the Joint Deployment Training Center be designated as the single source for standardization of deployment training. Secondly, deployment tasks contained in the UJTL and JP 3-35 are not synchronized. Consequently, the UJTL does not contain specific deployment tasks at the Strategic/National, Operational, and Tactical levels representing the "Joint Deployment Process" in accordance with JP 3-35. As a result, CCDR JMETLs and Service and Agency METLs do not reflect "Task, Condition and Standard" for all deployment tasks consistent with joint doctrine and policy. The study recommends that this be corrected by USJFCOM J7 with input from USJFCOM's J9 Joint Deployment Department as subject matter experts. In addition to the two overarching findings, 12 training findings were discovered which are summarized in Appendix A.

As an initial analysis of the After Action Reports, the findings related to the responsibilities of Unit Movement Officers were culled out from the general comments. Based on the information developed during the After Action Report analysis (Appendix A), the following areas have been added as key learning objectives:

1. Movement control, loading, and documentation of hazardous cargo - especially ammunition.
2. Accuracy of Military Shipping Labels - especially the accuracy of vehicle dimensional and weight data.
3. Accuracy of vehicle load plans for cargo loaded in truck beds.
4. Accuracy of the TC-AIMS II Deployment Equipment List (DEL).
5. Equipment tie-down procedures for cargo placed on railcars.
6. Use of appropriate instructional manuals for deploying unit equipment.
7. Establishing the proper working relationships between the deploying unit and the deployment support representatives.

The following table provides additional summary data.

Table 1: Joint Force Deployment Lessons Learned

ARMY LIVE FORCE DEPLOYMENT "FORT TO PORT" LESSONS LEARNED			
OBSERVATION	Gulf War Deployments	SEDRE	COMMENTS
1. PSAs tailored to support different functions at different ports.	Some PSA functions contracted out to commercial sources.		Labor intensive operations taps out non-deploy pool of soldiers.
2. Disorganized vehicle staging areas prolong ship loading operations.	TTU was hampered by unit vehicles not staged for ship loading plan.	See Observation 15	Vehicles must be staged by type first then by subordinate unit. Major unit rep must be at the port.

3. Inaccurate Organizational Equipment List (OEL).	Ship "weighed out" before it "cubed out" due to OEL not reflecting "combat-loaded" vehicles.	See Observation 17	Proper procedures for OEL to DEL transition.
4. Inaccurate LOGMARS/MSL labels.	OEL databases not supporting shipping labels.	See Observation 29	Combat configuration of OELs must be updated.
5. Large- sized supercargo teams expensive to equip and sustain.	Ship resources exceeded by unit personnel. Units had to purchase local sustainment items		LMSRs have berth space and shipboard facilities for 50 SCP. Proper planning for supercargo required.
6. Deploying CSS Bn tasked with DACG duties.	Unit unable to meet its own 48 hour loading requirement due to its logistical support mission tasking.		Unit identified for imminent deployment should not be committed to a deployment support mission.
7. Foreign ship characteristics not included in ICODES.	Many inaccuracies exist prior to TTU inspection.	See Observation 14	Information received on foreign flag ships must be considered tentative.
8. Planning factors used for time to move ship through port were inaccurate.	Total ship port time factors were not developed prior to Desert Shield/Storm.	See Observations 22 and 23	Training exercises should include all procedures associated with actual deployment.
9. Unit movement from fort to SPOE was slower than planned.	Cargo was not available for loading on waiting sealift ships during Phase I 30 % of the time and during Phase II 70 % of the time.	See Observations 15	Procedures must be established and practiced on a regular basis.
10. Actual square footage available for cargo stowage not known prior to loading.	See Observation 7	During the operational test of T-AKR 295 all pre-stow plans were found to be inaccurate resulting in cargo left on the pier.	Procedures for obtaining accurate ship useable cargo loading area must be developed and coordinated between all agencies.
11. Use of optimal loading procedures not followed for ships with multiple cargo flowpaths.		Independent internal cargo flowpaths were not established during T-AKR 295 OT. Ship design supports concurrent RO/RO and LO/LO operations	Optimal loading procedures must be known and published prior to exercises or contingency operations.
12. Army does not utilize a formal loading plan to guide the ship loading process.		During T-AKR 295 OT the load plan was verbal. The pre-stow plan provides the "where" while the load plan provides the "how".	Documentation procedures for developing a load plan must be established and practiced.

13. Improper number of commercial stevedore resources.		The initial number of three commercial stevedore gangs during T-AKR 295's OT was inadequate.	Analysis by the Program Office indicated that the minimum number of gangs should initially be four.
14. Ship characteristics data not accurate.	See Observation 7	T-AKR 295 OT pre-stow plan contained errors.	Joint Navy/Army ship check must be conducted.

Table 1

Activity Model Development

An IDEF0 Activity Model for the fort to port deployment of the 3rd Infantry Division (Mechanized) was completed during this study. The model and additional information on the modeling process are contained in Appendix B.

Training Media Selection Process

The first step in the selection process was determining how the previous SEDRE live training program could be supported by training media available. This step included the review of AARs, unit visits, interviews with key deployment personnel and the observation of several Sealift Emergency Deployment Readiness Exercises. The consensus was that, although live training is effective, there is insufficient on demand training available for Unit Movement Officers and Joint force deployment planners.

Determining which training media would best support Joint force deployments and specifically 3D ID fort to port deployment training took additional analysis. To conduct this analysis, the Southwest Research Institute Automated Media Selection Model was employed. Input for the model was obtained during the data collection process. The first input data group was related to the type of learning involved in the fort to port deployment process. Data related to the type of student targeted for the training comprise the second data group. The third data group involved the resources and other factors involved in the deployment process.

Automated Media Selection Model Data Inputs

Type of Learning Characteristics

The learning characteristics input to the model included the requirement for training in decision making, declarative knowledge, and intellectual skills. Intellectual skills included:

- Discrimination
- Concrete Concepts
- Defined Concepts
- Rules
- Problem Solving
- Cognitive Strategy

The training was characterized as follows:

- Dangerous in nature because of the large amount of heavy equipment being transported between transportation modes with hazardous cargo loaded.
- Damage to the equipment was input as a normal occurrence during deployment.
- The process being trained was identified as being complex in nature because of the extensive process requirements.
- The training domain was input as being Federal Government - Military.
- The operating environment was described as primarily a mechanical process without the need for a spatially dynamic environment (does not need a 3 - dimensional visual quality). However, the need for a visually dynamic (moving) environment along with written input was input as being required.
- While the results of human actions must be visualized, it was not considered a need to display the physical actions of human beings.
- Even through the input to the model was negative on human action portrayal; the final design incorporates human briefings using digital video technology.
- A requirement for practicing speaking and listening skills (as would be required for air traffic control personnel or pilots) was not indicated as a requirement.
- Interaction with the environment was input as a requirement to the model. This is one of the important aspects of live training since it is the cause of most random events during deployment.

The following are additional learning characteristics used as inputs:

- Events do not need to be scaled relative to the user
- Student will have more than one opportunity to achieve 100 percent accuracy
- The task content was not considered stable (procedures often change).
- There are limited live deployment process training opportunities.
- The deployment process, which is the object of the training, was noted as currently existing.
- Placing all activities of the deployment process on video tape was input as not possible.
- It was input that students could be expected to perform the duties being trained (Unit Movement Officer duties) immediately.
- Experts on the deployment were identified as being available to assist UMOs if a critical situation arises.
- A large number of participants were identified as necessary for live deployment training.
- The deployment process was identified as requiring cooperative teamwork skills.
- Live training was identified as possibly damaging the environment through the shipment of large quantities of hazardous cargo.

- Actual equipment was not considered capable of adequately simulating malfunction or a crises situation without equipment damage.

Type of Student Learner Characteristics

- The learners were identified as adults who can read at least at the eighth grade level.
- The number of students to be trained each year was identified as being between 100 and 300 individuals.
- The UMO turnover rate was input as being low (dozens per quarter).
- The UMOs were identified as requiring a lot of retraining or refresher training. However, continuous practice (as in swinging a golf club) was not considered a requirement.
- Finally, the students were identified as being highly motivated, similar in abilities, and computer literate.

Resources and Other Factors

The following resource and other factors were input to the model:

- Computers were identified as available.
- Training locations were input as taking place at many locations in the United States.
- Local and wide area networks along with Internet connections were input as being available.
- Instructors for deployment training were identified as being in short supply.
- Instructors were identified as requiring training prior to using an alternative training media.
- Existing printed and computer based instructional material related to the deployment process were identified as currently available.
- The actual equipment was identified as being available for training.
- Classrooms and learning laboratories were input as available to support deployment training.
- Maintenance support was input as available for alternative training media.
- The amount of training data that would be collected for any alternative training media was characterized as extensive. Extensive is defined as including all aspects of task performance including administrative record keeping, schedule generation, answer judging, and report generation.
- The training application development budget was input as $450,000.
- The time to develop the training program was identified as being between six to twelve months.
- The length of current initial training was identified as five days.

Media Selection Factors

The model run used the following media selection factors for picking the best alternative training media:

- Numerous participants working under realistic conditions
- Requires teamwork development
- Must distinguish between visual aspects
- Students at multiple locations
- Requires refresher training
- Adequate training budget
- Task must be performed at the start of job
- Can damage the environment
- Equipment unable to simulate malfunctions and crises.
- Human actions need to be displayed in training
- Must interact with others
- Training is not a “one-shot deal”
- Task is complex.
- Equipment can be damaged.
- Task is dangerous.
- Task content is unstable.
- One hundred percent accuracy is unnecessary.
- Must interact with the environment.
- Insufficient instructors.

Model Selection

Based on the input, the model strongly recommended a Computer Based Training Program as the alternative media solution. A Distributed Interactive Simulation was identified as the best delivery media. This selection was based on:

- Adequate training budget
- Adequate time to develop training
- Large number of participants must practice under realistic conditions
- Training requires development of cooperative teamwork skills
- Task is complex.

For the SM21 JLETT training program development, the definition of a Distributed Interactive Simulation (DIS) is defined as a set of communication protocols within a Service Oriented Architecture (SOA) that will enable commercial training, models, simulations, equipment and process simulation web services, and instrumented equipment to engage in a multi-player simulation using shared 3D graphics and databases.

An alternative to a true DIS could be a two dimensional CBT program within a SOA architecture using a local or wide area network to allow collaborative play. This collaborative network can also be established through the Internet. While the Automated Media Selection Model was useful in confirming the utility of a CBT program, the type of program selected, DIS, may not be practical as an initial solution. Additional analysis by the SM21 JLETT will be required based on funding availability.

Return on Investment.

The return on investment could not be fully calculated since at this point the scope and extent of the SM21 JLETT project is not known. However, basic calculations completed provide a cost benefit estimate.

Table 2: Return on Investment Calculations

Live Training and CBT Cost Comparison		
Cost Category	**Live Training**	**CBT**
TDY/Rental Cars/Conferences	$45,000	
Sealift		
FSS Lease (5 days)	300,000	
Savannah Port Handling	1,333,000	
Savannah Port Support	54,300	
Subtotal	$1,687,300	
Rail Transportation DRF Ft. Stw-Sav-Ft. Stw	285,000	
Class IX/Recovery/Maintenance	24,000	
General Supplies/Service/Emergency Funding	18,700	
Training Program Development		443,463
TOTAL	**$2,060,000**	**$443,463**

Table 2

Conclusions

General

After determining that a computer based training program for the 3rd Infantry Division (Mechanized) was possible and practical, the game design was developed using the IDEF0

Activity Model and Process Model as guides. The initial and basic design storyboard document can be found at Appendix B.

Design Decisions

As a result of this study and the iterative design process, several guiding CBT design decisions were made. The following is a list of the decisions used to guide the game design:

1. The training medium should be a computer based training program.
2. The focus of the initial SM21 JLETT development effort should be the deployment of one Army Battalion
3. The training focus should be placed on Unit Movement Officer duties at the company and battalion level.
4. A high physical and functional fidelity is an important aspect of the CBT.
5. The CBT should provide the time-decision pressure faced in actual deployments.
6. The following training objectives, established by the After Action Report reviews, are to be emphasized:
    a. Movement of hazardous cargo - especially ammunition
    b. Accuracy of Military Shipping Labels - especially the accuracy of vehicle dimensional and weight data.
    c. Accuracy of vehicle load plans for cargo loaded in truck beds
    d. Accuracy of the Organization Equipment List (OEL) and the Deployment Equipment List (DEL)
    e. Use of appropriate instructional manuals for deploying unit equipment
    f. Establishing the proper working relationships between the deploying unit and the Deployment Support Brigade representatives
7. The CBT should provide both training and information in the form of reference material. This lead to the decision to include deployment reference guides and Internet connections to appropriate sites.
8. The CBT should incorporate a 3D ID Deployment Overview in the form of a simulated process walk-through
9. The step by step decision process required to deploy a unit form the fort to the port must be included
10. Incorporation of an automated After Action Review Process must be the primary means to inform a player how well the deployment was completed

Development of the First Computer Based Training Program

The first CBT program should be developed based on the design at Appendix B. This should be the first step in developing a Distributive Interactive Computer Based Training Program. The following incremental development steps are recommended:

- Conduct a Unit Movement Officer pre-test to determine the current training level.

- Develop a CBT for the 3D ID focused on the Unit Movement Officer. The initial CBT program design can be found at Appendix B.
- Conduct a post use test to determine the effectiveness of the first CBT program
- Results of the post use test should be analyzed before the development of additional CBT programs for other Army units. The results of the analysis could indicate that continued development of CBT programs is not warranted because of a lack of training effectiveness. The analysis could also indicate minor or significant weaknesses in the first program that require fixing in subsequent CBT program development. If continued development is found to be the right decision, then the following steps should be pursued:
- Add to the functionality of the CBT programs by allowing collaborative play (via a local area network) between division UMOs and Port Support Activity personnel
- Provide the ability to allow collaborative play between deploying UMOs and the military and commercial transportation network managers.
- Incorporation of Findings and Conclusions in the CBT Program Design

With the analysis confirming the usefulness of a CBT program, a design was developed based on the findings and conclusions of this study. The complete design is at Appendix B. The CBT program will center around one battalion loading on one strategic sealift ship.

The CBT program was tentatively titled SEDRE primarily for identification purposes. A more "dramatic" final title is probably appropriate. It should be noted that the terms "CBT," "game," and "SEDRE" have all been used to describe the proposed computer based training program in the design at Appendix B. Additionally, the terms UMO and player are used interchangeably in this document.

The design incorporates the commercial computer game technology developed over the past twenty plus years combined with a user friendly graphical user interface design. The use of commercial computer game technology is designed to make the game as desirable as possible to play. The rationale employed is that the more "playable" the CBT program is the more it will be used by the target audience. Further, the more the CBT program is used, the more overall deployment experience stakeholders/players will gain. This is the overall objective of the CBT program - providing additional deployment experience without the high cost of live Joint force deployment training.

As the design decisions above indicate, a high degree of functional and physical fidelity is important to ensure the appropriate transfer of skills to actual deployments. The training objectives, established by the review of After Action Reports, also dictated the requirement for a high degree of functional fidelity. As an example, the movement of hazardous cargo, especially ammunition, requires careful attention to loading and documentation procedures to prevent accidental detonation.

As established in the training objectives, details are important, and therefore, a high degree of functional fidelity is important for the CBT program. To obtain a high degree of functional fidelity, the program will be based on the deployment requirements defined by the 3d Infantry Division (Mechanized) and Fort Stewart Regulations and written operational plans. One of the primary reasons for selecting the 3D ID as the first unit to receive a CBT program, was the maturity and detail contained in unit deployment documentation.

To create the real world deployment time-pressure for decision making, SEDRE is designed as a time-based program. Unlike turn-based games, which allow a player unlimited time to make a decision; SEDRE will require the player to make a decision in a "time-pressure" environment. Timing constraints will define response time requirements for the player and his environment. The time-pressure element of SEDRE compliments the high degree of functional fidelity placed in the CBT program design.

A high physical fidelity for the CBT program requires both the look and feel of the real world environment. The real world look is established in the design through the use of high quality artwork/graphics. The feel for the environment is developed through the use of probabilistic functions. In the SEDRE CBT program, as in real life, random events and "disasters" will occur. SEDRE will present icing, hurricanes, and major infrastructure failures to overcome. In addition to disasters, SEDRE will incorporate randomly generated event times and unexpected disruptions and changes to the deployment process. These random events will be designed to provide the player with the same experiences in the game that he could expect to encounter in the real world. Every time the game is played, different situations and event times will be encountered. The intent is to build as much experience as possible to improve the role based Joint force deployment player's intuitive decision making ability.

The SEDRE design also provides for the ability to show players the positive and negative impact of their decisions in directing the deployment of their unit. The time-space relationship will be condensed to show the impact of unit level decisions on the overall deployment times. If a player fails to ensure his equipment is ready for transport, the impact of the discrepancies, no matter where they impact, will be provided to the player. An example would be an inaccurate Deployment Equipment List that delays preparation for ship loading at the Port of Savannah. In an actual deployment or live training event, a UMO would not normally be aware of the impact of his mistakes after his unit equipment departed the home station. The SEDRE design establishes the procedure to make the player accountable for his or her mistakes or oversights wherever they occur. This accountability process is designed to be an integral component of the SEDRE CBT program After Action Review. The training objectives established above will be made the focus of all After Action Reviews.

Summary

The pre-deployment training program design has been developed using the findings and conclusions established during this study. The focus of the proposed CBT program is on the battalion level UMO preparing a battalion sized unit for deployment on a single strategic sealift ship. The physical and functional fidelity of the deployment process has been established as a high priority requirement. Random events were established as a part of the design to enhance the functional fidelity of the CBT program and improve the quality of the training. An automated After Action Review process has been incorporated in the CBT program design. The training objectives established in this study will be reviewed, at the end of each "game play," during the automated After Action Review process. All of these design considerations are being included in the proposed CBT program design to ensure the fort to port deployment objectives of the Joint forces are met.

Appendix A: After Action Report and Study Reviews – A Living Document

Introduction

Appendix A contains a review of relevant Joint force deployment studies and After Action Reports associated with specific unit deployments. The first section provides an overview of the most relevant Joint force deployment and education studies. As additional studies are received and reviewed they will be added to this living document.

Joint Force Deployment Education and Training Studies

While this study has not yet been officially released and action for recommendations has not been assigned as of this review this study contains valuable insight concerning Joint force deployment education and training requirements. This study was initiated to support the Joint Requirements Oversight Council's Memorandum (JROCM) 042-05, "Operation IRAQI FREEDOM (OIF) Lessons Learned – Deployment Planning and Execution" dated 16 February 2005, which tasked the USJFCOM to "develop (a) near- and long-term plan to incorporate deployment planning and execution training and education in partnership with combatant command exercises worldwide." The findings and recommendations addressed in this report are intended as a response to the JROCM 042-05 tasking to JFCOM. They address the question of whether or not available deployment training courses are consistent with the current deployment planning and execution guidance provided in joint doctrine and policy.

The training findings are provided below. Each finding includes the basic finding, the recommendation, and the SM21 JLETT Training Implications.

TRAINING: The study reviewed 51 Service and joint Programs of Instruction (POIs) and reported the following 12 findings with recommendations for each:

1. Training Finding 1: Outdated deployment phases referenced in US Army and USAF POIs. (inconsistency)

   Recommendation: Update training courses to reflect the deployment phases outlined in current joint doctrine.

   SM21 JLETT Training Implications: It will be important for any training programs developed to use the current deployment phases referenced in US Army and USAF POIs and consider the implications of any documented inconsistencies.

2. Training Finding 2: Outdated references and terminology found across POIs. (inconsistency)

   Recommendation: Awareness of current doctrine and routine referral to the Joint Doctrine Electronic Information System (JDEIS) would help joint and Service deployment training providers remain abreast of changes to joint deployment doctrine, policy and terminology.

   SM21 JLETT Training Implications: Any training programs that are developed must be based on current doctrine. The training must be updated on a scheduled or as required basis by routine referral to the Joint Doctrine Electronic Information System (JDEIS).

3. Training Finding 3: Limited reference to JP 3-35. (gap)

Recommendation: JP 3-35 should be included with suggested student read-ahead materials for deployment related curricula.

SM21 JLETT Training Implications: Any Joint force deployment training system developed must include the JP 3-35 Joint deployment processes.

4. Training Finding 4: The "Joint Deployment Process" is not included in current JDTC curriculum in accordance with CJCSI 6721.02B. (gap)

   Recommendation: The JDTC should again offer the "Joint Deployment Seminar" course in residence and on the JKDDC, or, on request, by MTT.

   SM21 JLETT Training Implications: No direct impact on SM21 JLETT systems or training development but if the Joint Deployment Seminar is not provided the JLETT may be able to develop a computer based training program to provide the support.

5. Training Finding 5: No joint deployment training on the Joint Reception, Staging, Onward Movement and Integration (JRSOI) phase. (gap)

   Recommendation: Although student guides in two of the JOPES courses refer to JRSOI as a phase of the joint deployment process, no classroom time or practical exercises are devoted to it. JDTC should offer training on all phases of the joint deployment process, including the JRSOI phase.

   SM21 JLETT Training Implications: The SM21 JLETT could provide support for training on all phases of the joint deployment process, including the JRSOI phase through the SEDRE CBT.

6. Training Finding 6: There was no Service or joint training covering Request for Forces/Request for Capability (RFF/RFC) or Force Tracking Number (FTN) procedures.

   Recommendation: JOPES curricula should be expanded to include coverage of FTN and RFF/RFC.

   SM21 JLETT Training Implications: SM21 JLETT training applications should address FTN and RFF/RFC

7. Training Finding 7: There are no established relationships between the JDTC and Service deployment training organizations. (related finding)

   Recommendation: The JDTC should establish habitual relationships with Service deployment training organizations and should be marketed as a resource for joint deployment course development to promote standardization between joint and Service training providers.

   SM21 JLETT Training Implications: None

8. Training Finding 8: No direct linkage or synchronization exists between joint deployment process tasks identified in the JP 3-35 joint deployment process maps and deployment related tasks contained in the UJTL. (related finding)

   Recommendation: The JDPO must ensure that the UJTL contains an accurate description of each distinct deployment task and the supporting measures to promote coherence and consistency between doctrine, policy and combatant command and Service training.

Deployment Process Maps in JP 3-35 should be linked to the deployment tasks in CJCSM 3500-04D.

SM21 JLETT Training Implications: Not an area the SM21 JLETT can directly support without a directed contract.

9. Training Finding 9: CJCSI 6721.02B does not provide a process to ensure approved training reaches user groups or the JPEC. The process to develop new training requirements works well, but there is no oversight process to modify existing curriculum. (related finding)

   Recommendation: The JS J3, through CJCSI 6721.02B, should ensure new training requirements approved through this process result in actual delivery of training.

   SM21 JLETT Training Implications: The JLETT would need to comply with any approval process for new training requirements approval process to support the actual delivery of the required training.

10. Training Finding 10: USJFCOM J7 is not assigned a role in the joint deployment training requirements development process. (related findings)

    Recommendation: Joint Staff J3 should designate USJFCOM as a Co-Chair of the Geographic CCDR Training Working Group to enable them to be involved in the development processes of new joint deployment training.

    SM21 JLETT Training Implications: None

11. Training Finding 11: The JDTC operates under a charter written in 1989 for the JTO. (related findings)

    Recommendation: USJFCOM review and update the charter to reflect the current mission of the JDTC and update references to information systems and joint deployment planning and execution processes.

    SM21 JLETT Training Implications: None

12. Training Finding 12: Joint Deployment Process Owner (JDPO) interests are not served in current deployment training management process.

    Recommendation: The JDPO should be involved in the GCCS-J training management process in which joint deployment training resides in order to ensure JDPO interests are represented.

    SM21 JLETT Training Implications: None

After Action Report Reviews

Each lesson learned is presented in four parts: (1) the general observation, (2) a discussion of the observation, (3) a synopsis of the lesson learned from the observation, and (4) implications for training. Only observations directly relating to the deployment of forces from the home fort to the strategic port of embarkation, to include ship loading operations, are included in this Appendix. The Lessons learned contained in this Appendix include the data collection effort conducted in September to October 2007 during the deployment of the 4th Brigade, 3rd Infantry Division to Iraq. Previous force deployments from the Gulf War Deployments including Desert

Shield/Desert Storm and Operation Iraqi Freedom are included; however, additional AAR input is required on the initial deployment associated with Operation Iraqi Freedom. The Sealift Emergency Deployment Readiness Exercises that were conducted between 1993 and 1996 are included in this Appendix.

Lessons Learned from the 2007 Deployment of the 4th Brigade, 3rd Infantry Division to Iraq

The deployment of the 4th Brigade, 3rd Infantry Division, from Fort Stewart, Georgia through the Port of Savannah Ocean Terminal during September 2007 was monitored by members of the SM21 JLETT. The actual deployment observation was focused on the collection of performance data from the time equipment entered the marshalling areas on Fort Stewart through final ship loading. The baseline data was later compared to the results of the modeling, simulation, and analysis completed to define the potential benefits of establishing more agile deployment processes through business process reengineering, modeling and simulation, and experimentation.

OBSERVATION (SM21 JLETT Team Members): The force deployment observation and associated data collection and analysis confirmed that the current processing of rail, line haul, and convoy movements to the strategic port of embarkation are completed in a more linear manner, rather than dispatching equipment to port in the order of planned loading.

DISCUSSION: The observed primary impact of the linear processing of equipment for movement to the port is that at least 95% of equipment is marshaled on the marine terminal before ship loading is initiated. This is caused by a number of factors, including the late nomination of a ship to be used for deployment, stove piped information management systems, poor data quality, and less than optimal business and functional processes. The current force movement procedures, using linear dispatching practices from the PPP, results in extended force deployment times and significant disruption to normal commercial operations by occupying large areas of the marine terminal for equipment marshalling over extended periods of time.

LESSONS: The linear deployment of equipment to the port is the result of many of the observations collected during previous live force deployment operations as documented within this AAR review appendix. To compensate for the habitual errors in the processing and movement of equipment to the port of embarkation, all deploying equipment is moved to the port before ship loading operations begin. This processing practice is the result of incomplete information management system integration that is required to dynamically plan and re-plan deployment operations.

TRAINING IMPLICATIONS: The training implications for this observation are a summary of all the other valid observations in this appendix. This observation and the analysis of the training implications will require more direct work with the numerous Joint force deployment stakeholders. Once the SM21 JLETT has been fully established this effort will need to be addressed in detail prior to the development of a pre-deployment training system.

Lessons Learned from the Operation Desert Shield and Desert Storm Deployments

The Operation Desert Storm/Desert Shield deployment was the first major rapid deployment of Army forces since World War II. Slightly more than 3 million short tons of dry cargo were moved to Saudi Arabia by sealift. The Operation Desert Shield/Desert Storm deployment was divided into two phases. Phase 1 started on 7 August and was completed on 7 November 1990. Phase II was initiated on 8 November and was completed on 28 February 1991. The lessons learned from both phases of this deployment can be used as a baseline for determining how well the force deployment capabilities of Army forces have progressed since 1991. The primary source for each Lesson Learned is listed after the OBSERVATION header.

OBSERVATION (Center for Army Lessons Learned): Port support activities (PSAs) were tailored to support different functions at different ports.

DISCUSSION: The PSA's responsibility is to receive unit equipment being deployed at the seaport marshaling area and prepare it for loading aboard ship. PSA functions include management of unit equipment on the port up to the point of loading. The specific PSA functions normally include: clerical support, maintenance of vehicles, staging equipment for the Transportation Terminal Unit (TTU), security, housing PSA work force, food service, railcar off-load, and the repositioning of vehicles on the port. The PSA is often responsible for providing large tracked vehicle drivers for loading Roll-on/Roll-Off ships. Normally all wheeled and small tracked vehicles are loaded by commercial stevedores. The M1 Abrams tank is one example of a tracked vehicle that the PSA is responsible for driving onto the ship. During the Desert Shield/Desert Storm Operations, some PSA functions were contracted out to the private sector. For example, one PSA contracted housing with local motels/hotels and had food service catered by a commercial cafeteria. Aircraft were prepared for shipping under contract and commercial stevedores off-loaded railcars and drove vehicles to the port staging area. At some locations, the port authority provided security functions in the port area.

LESSONS: PSA operations are labor-intensive. The work force may easily require 100-200 soldiers if there are multiple railheads, convoy reception points, marshaling areas, staging areas, and concurrent ship loading. The PSA should be staffed with soldiers not scheduled for deployment when sufficient numbers of soldiers are available with the necessary skills (such as track and tank drivers, mechanics). The learning curve for training PSA laborers and drivers is relatively short. However, labor and driver pools experience frequent turnover of personnel when soldiers not scheduled for deployment are not available in sufficient numbers. Good supervision is necessary to preclude accidents especially when personnel are tired due to long work periods and unfamiliar with equipment and the port. Resources required by the PSA to manage its operations include: (1) lap-top computers, (2) a copier, (3) typewriters, (4) assorted office supplies, (5) rail load breakdown tools, (6) hard hats, (7) hearing protection, (8) safety vests, (9) medical support with ambulance, (10) hand-held radios, (11) portable/mobile (STU III-type) secure communication equipment and (12) air-conditioned office space to keep high-technology equipment out of the heat, dust and weather.

TRAINING IMPLICATIONS: Planning for the appropriate PSA composition requires a thorough knowledge of the port support activities. The proper coordination between Transportation Terminal Units (now referred to as Transportation Terminal Brigades), the Deployment Support Brigade, the deploying unit, and the Military Traffic Management Command must be understood before deployment operations begin. The learning objectives for ensuring effective PSA operations include the following: (1) determination of the appropriate work force structure for the specific deployment port and unit(s) being deployed, (2) establishing effective command and control procedures for port support operations, and (3) ensuring appropriate supply and support equipment is available for PSA operations, and (4) establishing proper support functions such as maintenance.

OBSERVATION (Center for Army Lessons Learned): Disorganized vehicle marshaling and staging areas prolong ship loading operations.

DISCUSSION: On several occasions vehicles were parked in a disorganized scheme. This hampered the ship loading operations performed by the TTU. Marshaling areas are used to receive convoys and rail shipments and process vehicles before they are staged for loading. Preventative maintenance is performed as well as any required organizational or direct support maintenance; nested loads (secondary loads on prime movers) are checked for security and documentation for the movement is completed.

LESSON(S): A representative from the major unit being deployed (brigade or regiment) should be at the port from the beginning of the loadout. This unit representative should be authorized to make decisions regarding the priority of vehicle loading on ships. Vehicles should be parked by type first, then further divided by subordinate unit. The major unit indicates its priority for loading by the order in which the vehicles are parked. This is beneficial to both the deploying unit and the TTU in calling vehicles forward for loading.

TRAINING IMPLICATIONS: Unit Movement Officers, the Division Transportation Officer, and the Division's Operation Officer must coordinate the priority of unit movement during the X Hour (time before first vehicle departs the unit motor pool) sequence of events. Proper coordination procedures between the deploying unit, the Deployment Support Brigade, and the Port Support Activity must be established and practiced.

OBSERVATION (Center for Army Lessons Learned): Inaccurate Organizational Equipment Lists (OELs) delayed at least one ship from sailing.

DISCUSSION: A ship settled to the silt at its loading berth due to the unanticipated weight of unit equipment loaded in combat configuration. The ship "weighed out" before it "cubed out." As the tide went down at the ship loading berth and the amount of equipment loaded on the ship increased, loading ramp inclines became too steep for use. Loading operations had to be halted until high tide to off-load enough weight to permit the ship to sail. The vehicles taken off the ship were loaded on a subsequent ship. The planned load weighed more than anticipated because the unit's OELs were inaccurate. Unit vehicles were configured for combat with unit basic loads (UBLs) on board the ship, but the additional weight of fuel and ammunition was not included in unit OELs. OELs actually reflected the weight and cube of unit equipment configured for an administrative, peacetime deployment to a major training area. In addition, secondary cargo loaded on vehicles (nested loads) often was not included in the OELs.

LESSON(S): Several factors influence a ship's ability to sail: cargo weight, the placement of cargo on the ship (load plan), ship draft when loaded to capacity, berth or channel depth, and tides. OEL accuracy is a unit responsibility. The OELs must reflect the actual weight of unit equipment. When equipment cannot be loaded as planned, subsequent ship loading plans are disrupted and scheduling of other convoys and rail shipments into the port must be adjusted to avoid clogging the port. Nested loads must be included in the OEL so their weight and cube are counted in the total load. Military shipping labels must also be used to track secondary cargo in the current information management system in case they are separated from prime movers for stowage aboard ship.

TRAINING IMPLICATIONS: Proper procedures for establishing the pre-deployment OEL and the deployment equipment list (DEL) must be understood and practiced. Coordination procedures with the Installation Transportation Officer and proper documentation of both the OEL and DEL must also be practiced.

OBSERVATION (Center for Army Lessons Learned): Many Logistics Marking System (LOGMARS) labels (currently referred to as Military Shipping Labels (MSL) had to be remade at the port.

DISCUSSION: The OEL is used to generate LOGMARS labels. However, the combat configuration of unit equipment was not properly reflected in some OELs. This meant the LOGMARS labels generated by the OELs were unusable. Re-labeling the loads had to be done at the port by the TTU. While this worked, the management and tracking system was more reactive rather than proactive.

LESSON(S): For the LOGMARS labeling and tracking system to be effective, units must submit accurate data for the OEL databases.

TRAINING IMPLICATIONS: LOGMARS labels are currently referred to as Military Shipping Labels (MSL). The proper preparation of these labels must be practiced on a regular basis. This is accomplished by ensuring the correct dimensional and weight data is entered into the OEL database. Experience in using TB 55-46-1, Standard Characteristics for Military Vehicles, is required.

OBSERVATION (Center for Army Lessons Learned): Large-sized supercargo teams were expensive to equip and sustain for the voyage.

DISCUSSION: Supercargo teams are soldiers who accompany the unit equipment on during the ship sailing. They are almost always assigned to the unit which owns the deploying equipment. Supercargo teams supervise, guard, and maintain unit equipment aboard ship. They also monitor equipment tiedowns for security, provide vehicle key control, monitor equipment condition. Upon arrival at the seaport of debarkation (SPOD), they brief the port Commander on vehicle condition and any peculiar aspects of the cargo. Normally the size of the supercargo team is limited by the number of passenger berths available on the ship-usually about 12. During Operation Desert Shield/Desert Storm, one major unit deployed 100 soldiers on each ship. This exceeded the resources available for supercargoes on the ship. The command had to locally purchase life vests, life rafts and additional refrigeration vans for ship-board preservation of food.

LESSON(S): The size of the supercargo teams dedicated to each ship should be consistent with the team’s role in guarding and maintaining equipment en route, the resources available on the ship, and the additional costs required to equip and sustain the team en route. FM 55-65, Strategic Deployment by Surface Transportation, is a good reference on supercargo team composition, functions, planning and operations.

TRAINING IMPLICATIONS: The development of the appropriate supercargo team size and composition should be practiced on a regular basis. Leaders must be provided the opportunity to develop the appropriate supercargo team based on the type unit deploying, the ship class, and the force projection mission. This required a broad range of knowledge that can only be gained through the proper knowledge of ship characteristics, the deployment process, and unit employment procedures.

OBSERVATIONS (Center for Army Lessons Learned): A deploying Combat Service Support battalion received early alert notification of its pending deployment but was also given the deployment support mission of operating the departure airfield control group (DACG).

DISCUSSION: When the battalion was given final notification to load its equipment on a specific ship, the unit was given less than 48 hours to load the ship. The battalion was unable to respond to this requirement because of its commitment to perform the logistical support mission. The battalion had to be loaded on a later ship.

LESSON(S): Before scheduling a unit to deploy, Commanders must take into consideration the current commitment of that unit in support of the deployment. Consideration must be given to the time required for the committed unit to “de-link” from the support mission and prepare its personnel and equipment for deployment. A unit identified for imminent deployment should not be committed to a deployment support mission. If a unit required to deploy is given a support mission, sufficient time must be provided for the unit to complete the support mission, or be relieved of that responsibility in sufficient time to prepare itself for deployment. If a non-deploying unit is not available for a support mission, consideration should be given to activating a Reserve Component unit to perform the support mission from the beginning of the deployment cycle (or to assume the mission as soon as possible after activation).

TRAINING IMPLICATIONS: Division leadership must be familiar with the established Deployment Plan and the deployment support requirements. Leaders must be prepared to make appropriate support unit changes during the deployment process to ensure the timely deployment of the entire deploying force. Training should emphasize the sequential deployment process and the randomness of the process.

OBSERVATION (Center for Army Lessons Learned): The characteristics of foreign ships, contracted to supplement U. S. deployment capacity, were not included in the Computerized Deployment System (CODES) used to prepare ship loading plans.

DISCUSSION: Many foreign and domestic ship characteristics are not included in the CODES database. Basic ship characteristics (deck dimensions, square footage, deck heights, and deck loading limits) are not known or pre-loaded in CODES software. For example, the information received by a TTU on one foreign ship indicated the vessel had three forward “auto decks” for shipping vehicles with a height under 7’8”. However, when the ship docked and was inspected, TTU personnel bumped their hard hats on the ceilings of the decks. The deck heights were actually 6’. This invalidated pre-stow plans since many pieces of equipment planned for stowage on these decks would not fit.

LESSON(S): Information received on foreign vessels must be considered tentative, pending physical inspection of the ships after they are berthed for loading. Stow plans for ships not previously loaded by the Military Traffic Management Command might require updating after ships are loaded for the first time.

TRAINING IMPLICATIONS: Basic ship loading procedures must become second nature to transportation support personnel. Port Support Activity leadership, Transportation Terminal Brigade planners, and Military Traffic Management Command port operations personnel require continuous ship loading training which emphasizes the random nature of the deployment process. Areas that require emphasis are proper loading sequence, resource allocation, and general stow planning practices. Knowing these procedures will allow all concerned with the ship loading process to efficiently react to changes in ship configuration and other unexpected changes in the process.

OBSERVATION (Department of Defense Office of the Inspector General): The planning factors used for the total time needed to move ships through a port were inaccurate.

DISCUSSION: Planning factors for total ship port time were not developed prior to Desert Storm/Desert Shield. The planning factors used by Central Command (CENTCOM) (the command overall responsible for combat operations during Desert Shield/Desert Storm) and the U.S. Transportation Command only included the estimated time to load ships. Other port factors such as pilot time, lay time, bunkering (fueling), clearance, and administrative time were not included. To compound the problem the one area considered in total port time, ship loading, was found to be inaccurate in 68 percent of the port stops reviewed (a total of 110 port stops at 16 ports were reviewed. Overall, ships carrying unit cargo spent an average of 39 percent more time in port than planning factors accounted estimated. Ships carrying ammunition spent an average of 53 percent more time in port than anticipated. The inaccurate planning factors caused the operational commander to expect the ships to arrive much sooner than when they actually arrived. This same review found that a majority of the port time, 61 percent, was needed for loading cargo on ships. Since cargo loading takes a majority of port time, it is especially important to establish accurate ship loading times for the various types (classes) of ships.

LESSONS: Accurate port time planning factors are necessary to allow operational commanders to accurately plan and coordinate arrival of unit cargo in the theater of operations.

TRAINING IMPLICATIONS: Commanders, staff planners, and Unit Movement Officers must practice deployments as they would during actual deployment scenarios to valid port time planning factors. “Practice as you would fight” is an important training issue. Training exercises should include all procedures associated with an actual deployment.

OBSERVATION (United States Transportation Command): Movement of unit equipment from the unit’s home fort to the port of debarkation was slower than planned.

DISCUSSION: During Phase I cargo was not available for loading on waiting strategic sealift ships 30 percent of the time. During Phase II cargo was not available for loading 70 percent of the time. The slower than expected movement of equipment from the fort to the port of debarkation contributed significantly to the delay in closing the required force in the theater of operation.

LESSON(S): Proper procedures for the deployment of unit equipment from the fort to the port of debarkation must be established for all units with a deployment mission. Coordination procedures between all organizations responsible for the movement of unit equipment from the fort-to-port must be established.

TRAINING IMPLICATIONS: Deployment procedures must be practiced on a regular basis to ensure a high state of training readiness.

Sealift Emergency Deployment Readiness Training: Lessons Learned (1993-1996)

Lessons learned during Sealift Emergency Deployment Readiness (SEDRE) Training Exercises since 1993 have been reviewed and summarized below. Input for the SEDRE Lessons Learned summary was obtained from the former Military Traffic Management Command, Transportation Engineering Agency (MTMCTEA)[5], the 18th Airborne Corps Emergency Deployment Readiness Exercise Division, Stanley Associates, Incorporated and Naval Sea Systems Command (NAVSEA). NAVSEA input included After Action Reports form 17 ship loading data collection efforts in support of the development of a ship loading simulation. The findings from the operational test of the newest class of strategic sealift ship, the USNS Shughart, are included in the summary. This operational test was conducted in conjunction with a SEDRE conducted for the 3rd Infantry Division from Fort Stewart, Georgia to the Port of Savannah.

OBSERVATION (Stanley Associates): During the operational test the actual square footage of the USNS Shughart was not known before the ship was loaded. The impact of not knowing the available square footage during pre-stow planning resulted in extended total ship loading time. This is a problem similar to the observation made during Operation Desert Shield/Desert Storm when the correct characteristics of foreign ships were not known prior to actual ship loading.

DISCUSSION: The initial cargo list submitted by the 3rd Infantry Division (Mechanized) for loading contained approximately 1,295 pieces of cargo (226,000 square feet). Stow planners assigned to the Military Traffic Management Command, 1304th Major Port Command developed a pre-stow plan based on the cargo provided. The pre-stow planning indicated that 13,000 square feet of cargo could not be loaded on the ship. The individual preparing the pre-stow plan determined that some of the hositable decks could not be used because of the cargo mix height distribution. Only 01-A Deck Hold 1 was used for small wheeled vehicles and light trailers. As a result of the initial stow plan, the cargo load size was reduced by approximately 13,000 square feet.

The pre-stow plans, to include the final pre-stow plan used for loading, were prepared using outdated ship drawings. MTMC was using Revision C drawings when the most current drawings were Revision E. The final pre-stow plan provided to the loading organization was based on the Revision C drawings. While the Revision E drawings are more current than the Revision C drawings, physical ship checks, as noted above, found that the Revision E drawings did not reflect the actual available usable cargo space. The stow plan developed after loading the USNS SHUGHART, the “as-stowed” templated plan, used the current MTMC ship size estimate.

The actual ship loading revealed additional discrepancies between the Revision E drawings, MTMC final stow plan square footage, and the actual ship structure.

[5] The Military Traffic Management Command, Transportation Engineering Agency (MTMCTEA) is now referred to as the Military Surface Deployment and Distribution Command, Transportation Engineering Agency (SDDCTEA)

LESSON: The lesson of this observation is that without accurate ship dimensions for usable stowage area, an accurate pre-stow plan is not possible. The pre-stow plan for the USNS Shughart was in the development for approximately one month. This amount of time will never be available prior to an actual deployment. If accurate dimensional data is not known, then all organizations involved in the deployment process must maintain excellent coordination to prevent unnecessary delays.

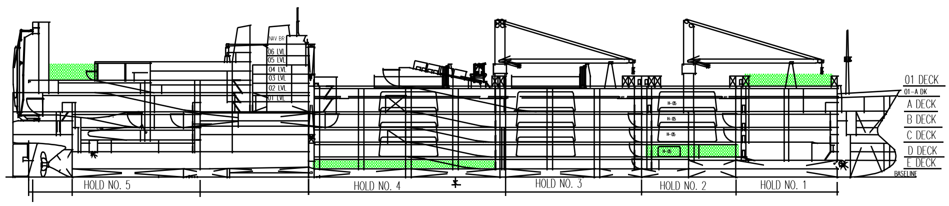
TRAINING IMPLICATIONS: Procedures for obtaining accurate ship useable cargo loading area must be developed and practiced. The coordination of available ship loading area and cargo to be loaded must be practiced during each deployment exercise. It must be anticipated that changes in ship class to be loaded and the available cargo space will occur during every deployment operation. Unlike the operational test of the USNS Shughart, only about four days will be available to plan for and load a ship during actual deployments.

OBSERVATION (Stanley Associates): Optimal ship loading procedures were not followed during the operational test of the USNS Shughart.

The design of the T-AKR 295 Class of Strategic sealift ships supports concurrent RO/RO loading on two separate cargo flowpaths. One path begins at the stern ramp and the second path begins at the sideport ramp. The internal ship cargo flowpaths can be established as independent paths to prevent flowpath conflicts for cargo entering the stern and sideport ramps. During the operational test, independent flowpaths were not properly planned for nor were the proper mix or numbers of loading personnel employed.

The program manager for the T-AKR 295 recommended balancing the flow of cargo between the independent flowpaths. Additionally, it was suggested that cargo staging areas be arranged according to the independent flowpath and associated entry ramp. None of these procedural suggestions were followed during the operational test. The side profile of the USNS SHUGHART, depicted below, highlights the three areas of the ship where loading was conducted by commercial stevedores during the first six hours of loading. The initial loading was restricted to three areas because only three commercial RO/RO gangs and no LO/LO gangs were used during the first six hours. At no time during the loading operation were more than three commercial RO/RO gangs assigned. In addition to the commercial RO/RO gangs one military driver crew was assigned to drive M1 and M2/M3 tracked vehicles. This crew began loading D Deck Hold 2 shortly after the loading operation began.

USNS SHUGHART



0-6 Hours Loading: 02 Level, 01 Deck Hold 1, and E Deck Hold 4

LESSON: The use of optimal loading procedures is necessary to ensure that the Army Strategic Mobility Plan deployment timeline can be met. The use of the optimal mix of loading resources, both human and mechanical, must also be employed.

TRAINING IMPLICATIONS: Optimal loading procedures must be known and practiced during each deployment training opportunity. The loading time impact of various cargo mixes and ship classes must be fully understood.

OBSERVATION (Stanley Associates): The Army does not utilize a formal load plan to guide the ship loading process.

DISCUSSION: The total time to load and off-load ships is controlled by the type of cargo to be loaded, the pre-stow plan, the load plan and the resources (both mechanical and human) employed. The pre-stow plan provides the “where” while the load plan provides the “how.” The pre-stow plan includes a drawing of the ship’s decks/holds with templates designating the stow location for each piece of cargo to be loaded. The load plan provides the number of gangs, by type, that are to be used during the loading operation. Additionally, the load plan can provide the staging area arrangement and the sequence of deck and hold loading (defines concurrent loading), and establishes the internal cargo flowpaths for RO/RO and LO/LO cargo. Unlike the pre-stow plan, the Army does not have a formalized load plan documentation procedure. The load plan is almost always a verbal plan. During the operational test there was no formal, written load plan for the loading of the SHUGHART.

LESSON: The lack of a fully developed ship load plan resulted in increased total ship loading time.

TRAINING IMPLICATIONS: Develop of ship load plans should be practiced on a regular basis. The impact of various cargo, resource and ship mix must be understood by all organizations involved in the fort to port deployment process.

OBSERVATION (Stanley Associates): The proper number and ratio of commercial ship loading gangs were not employed during the operational test.

DISCUSSION: Analysis has determined that the single most significant determinant of total load time is the number and proper ratio of RO/RO, LO/LO, and Lash gangs employed. The number and ratio of gangs assigned determine the amount of concurrent loading that can be accomplished during the loading process. During the loading of the SHUGHART, the initial number of RO/RO gangs assigned to load the ship was set at three commercial RO/RO gangs and one military RO/RO gang. Analysis conducted by the Ship Acquisition Program Office indicated that the optimum number of RO/RO gangs at the beginning of the loading process for the SHUGHART should be four commercial RO/RO gangs, one military RO/RO gang, and at least one LO/LO gang. The gang structure and areas loaded during the first six hours of the test are depicted above in the side profile of the USNS SHUGHART.

LESSON: The employment of the correct number and ratio of loading personnel is necessary to ensure that the Army Strategic Mobility Plan timelines are met.

TRAINING IMPLICATIONS: Practice in establishing the optimal mix of loading personnel for the type of cargo to be loaded and the ship class must be practiced on a regular basis.

OBSERVATION (Stanley Associates):

The pre-stow plan was developed in the Army's computerized ship load planning system known as CODES. As discussed, the ship drawing used in CODES was outdated. This was the first time this ship had been fully loaded and it is normal to find discrepancies in the amount of usable space available. The refinement of the actual usable space is an iterative process. The pre-stow plan errors were manifested during the ship loading operation in numerous loading delays. In several cargo holds, more equipment was templated for loading than could be physically accommodated. Conscientious Hold Load Control Officers from the 1176th TTB attempted to load the cargo templated on the pre-stow plan, but despite the best of efforts, the intended equipment could not be loaded. Delays resulted from: (1) excessive time to park maneuver equipment in an attempt to make the cargo fit and (2) requests from the hold to the call forward area for smaller pieces of cargo to fill the gaps when templated cargo did not "fit." Observations revealed that several vehicles were pre-stowed in areas that were impractical for the type and size of the vehicle. As an example, a HEMMT Fuel Tanker was placed between two stanchions resulting in a park maneuver time in excess of 20 minutes.

LESSON: Future Strategic sealift ship deliveries should be preceded by a joint Navy-Army ship check to more precisely determine the actual usable space on the ship. Additionally, personnel responsible for ship loading must anticipate changes to the loading pattern and respond to those changes in a timely manner.

TRAINING IMPLICATIONS: Pre-stow planning and ship loading command and control procedures require continuous training.

OBSERVATION (Stanley Associates): The proper pre-staging of cargo for loading was not followed during the operational test of the USNS SHUGHART. Equipment scheduled for loading did not arrived when needed causing loading delays.

DISCUSSION: All of the equipment to be loaded on the USNS SHUGHART had not arrived on the Port of Savannah prior to the beginning of the ship loading process. Some vehicles scheduled for loading in E Deck and the weather deck (01 Deck) were not available when needed. This resulted in the Hold Load Control Officer calling for vehicles not scheduled for loading in that particular area. The impact of this out of sequence loading was felt when the final areas were being loaded. Many of the pieces loaded out of sequence were needed in the final holds to achieve a more efficient stow factor. As a result, fewer pieces of cargo could be placed on the SHUGHART because of broken stowage caused by out of sequence loading.

LESSON: This is a significant repeat lesson from the Operation Desert Shield/Desert Storm Deployment. Cargo must be shipped to the port to accommodate the planned sequence of loading.

TRAINING IMPLICATIONS: Command and control of the deployment process must be practiced to ensure procedures are accomplished in the proper sequence.

OBSERVATION (Stanley Associates): The final stow plan was not completed in an accurate manner.

DISCUSSION: Numerous discrepancies were found in the "as-stowed" CODES drawing as compared with the actual location of items on the ship. This final as-stowed drawing is known as the "Battlebook" for off-loading ships. The battlebook plan for this particular load would have been critical to the in-theater off-loading unit because of a broken hatch cover on the weather deck in Hold 3. Directly under the hatch opening on A Deck was a CH-47 helicopter that was lifted into place. The only way to discharge the CH-47 was by crane lift. With the broken hatch the discharge required careful analysis to ensure efficient discharge. With the many discrepancies in the battlebook documentation, a good alternative discharge plan was not possible without a physical ship check.

LESSON: Accurate final ship stow plan is necessary to ensure that the ship can be off-loaded in the required time period.

TRAINING IMPLICATIONS: The proper documentation of the final equipment stow locations must be practiced and verified during every deployment training opportunity.

OBSERVATION (SDDCTEA): Validation of Authorized Unit Equipment Lists (OEL) and Deployment Equipment Lists (DEL).are not consistently developed or maintained in an accurate manner. Incorrect dimensional and weight data are often entered on Military Shipping Labels.

DISCUSSION: Vehicles departing the origin fort are not accurately documented in a consistent manner. The use of the correct height, width, length, and weight measures stems from two procedural problems. First, the proper use of TB-55-46-1, Standard Characteristics of Military Vehicles, is not always understood by soldiers using the document. Soldiers often select dimension associated with a shipping method other than the one they plan to use for the vehicle they are documenting. The second procedural error is using planning factors for administrative shipments when the unit is actually deploying to a theater of operations. When inaccurate dimensional data is associated with equipment that has arrived at the port of debarkation for loading, two problems result. The first, and more desirable of the two situations, is that the inaccurate data on the MSL is found when the vehicle first arrives at the port for loading. The detection of the inaccurate data results in the vehicle being placed in a "frustrated cargo" status until the errors can be corrected. In the second situation the problem is not detected until the vehicle is in the process of being loaded on the ship when it cannot be placed in the ship stow location assigned because of the equipment dimensions. At this point the impact is much more serious – the loading is delayed.

LESSON: The accurate use of TB 55-46-1 is necessary to prevent unnecessary ship loading delays and potential hazardous situations.

TRAINING IMPLICATIONS: Proper use of TB 55-46-1 must be taught on a regular basis. The varying impact of air and sea shipments on cargo dimensions must be included in training. Additionally, the difference between administrative and combat deployments must be understood by all concerned with the loading process. This is especially important since the new strategic sealift ships currently in the procurement process can carry ammunition and fully loaded fuel tankers in the same ship.

OBSERVATION (SDDCTEA): During rail shipments, vehicle condition at the fort of origin is not accurately documented prior to shipment to the seaport.

DISCUSSION: Unit equipment condition is not always documented prior to shipping the equipment to the port using commercial rail. On several occasions vehicles departed the fort of origin in a damaged condition. When the equipment arrived at the port, port operations personnel noted the damage and documented the damage as occurring during shipment. Accurate damage documentation at the fort will ensure the accurate recording of damage occurring during shipment.

LESSON: Accurate documentation of vehicle condition at the fort of origin is important to ensure that proper damage claims can be made to the commercial rail company. The Deployment Support Brigade should make a final check of the equipment at the train departure point and provide the vehicle condition report to the appropriate port management personnel.

TRAINING IMPLICATIONS: The proper documentation of equipment condition must be documented and practiced on a regular basis.

OBSERVATION (SDDCTEA): Vehicles are damaged during rail shipment because they have been improperly prepared for rail shipment.

DISCUSSION: During several rail shipments wheeled vehicles were damaged because they were not properly prepared for rail shipment. Side windows were not lowered, mirrors were not "turned-in," and vehicle doors were not secured. As a result on one shipment 62 wheeled vehicles were damaged. This damage has cost and combat readiness implications.

LESSON: The Division Transportation Officer and the Unit Movement Officers must ensure that drivers follow the proper procedures for preparing vehicles for rail shipment.

TRAINING IMPLICATIONS: The proper procedures for preparing vehicles for rail shipment must be reviewed and practiced on a regular basis.

OBSERVATION (SDDCTEA and the 18th Airborne Corps): Improper rail tie-down procedures were often observed. Proper procedures were not followed for a variety of reasons; however, the single most significant problem was that procedural manuals were not made available for use by soldiers.

DISCUSSION: During vehicle tie-down operations for rail shipments, some soldiers had questions on the proper tie-down devices and procedures to be used. The soldiers did not have access to SDDCTEA Pamphlet 55-19, Tiedown Handbook for Rail Movements. Soldiers were also observed improperly using tools required to load vehicles on railcars. Soldiers have been observed standing on ratchets and breaker bars to tighten chains. This poses a safety hazard for soldiers.

LESSON: Soldiers must be instructed on proper rail loading procedures and the proper use of tools. Appropriate technical information must be made available for soldier use.

TRAINING IMPLICATIONS: All soldiers responsible for rail shipment of vehicles must become familiar and use SDDCTEA Pamphlet 55-19. Training on the proper use of this reference source must be included in all deployment training exercises.

OBSERVATION (SDDCTEA): Vehicle securing shackles were left unsecured on rail flatcars (DODX) at the seaport.

DISCUSSION: When tanks were loaded at the port, shackles and rings were left lying loose on the decks of rail flatcars. These devices would be lost during the return movement of the railcars. Shackles and rings are no longer required to be maintained on DODX 4000 Series flatcars. Heavy tracked vehicles should travel with their appropriate tie-down shackles and rings.

LESSON: Tie-down devices should be secured to prevent loss. Rail loading personnel need to become familiar with proper vehicle tie-down procedures for rail shipments.

TRAINING IMPLICATIONS: Proper vehicle tie-down procedures for rail shipments must be practiced for every combination of military vehicle type and series of railcars.

OBSERVATION (SDDCTEA and NAVSEA): Improper ship loading procedures were observed during at least 75 percent of SEDRE training events. The improper procedures observed included vehicle lashing procedures, for securing military vehicles to the deck of the ship, incomplete or inaccurate cargo documentation, and improper vehicle stowage.

DISCUSSION: Personnel involved in SEDRE training events know when the ships being loaded will not sail upon the completion of loading. It is the exception for ships to sail after loading is complete. When ships are not scheduled to depart the pier, the ships are off-loaded immediately after completion of loading and the unit equipment is shipped back to its home fort. As a result shortcuts are often taken to reduce the amount of work and time involved with loading the ship. The wrong size and number of lashing chains are often observed being used. For example, M1 Abrams tanks requiring eight 70,000 pound chains were observed being secured with only four chains rated at less than the required 70,000 pound rating. It is often observed that vehicles are secured using securing points other than the proper tie-down provisions.

LESSON: Complete and proper ship loading procedures must be followed even when it is known that the ship will not sail. The wrong lessons are being learned when loading personnel are allowed to take “shortcuts.”

TRAINING IMPLICATIONS: Proper ship loading and equipment tie-down procedures must be utilized during SEDRE Training events. These proper loading procedures and the use of proper loading manuals must be routinely practiced. To do otherwise could result in the transference of improper procedures.

OBSERVATION (18th Airborne Corps and NAVSEA): Several key deployment sequence requirements are often not followed because deployments are for “training” only. Handling of ammunition and procedures for using Army War Reserve 3 equipment stored on ships afloat are not properly or fully practiced. Ammunition “play” is notional during SEDRE training events. The fact that ammunition movements are notional is not a significant training factor; however, not all “notional” ammunition loading procedures are followed.

DISCUSSION: During SEDRE training events, all ammunition movements are notional. However, not all notional procedures are followed. Vehicle load plans for ammunition movement and required hazardous cargo documentation is not completed. The proper completion of documentation and vehicle loading plans should not be effected by the fact that the ammunition is not physically loaded in vehicles for shipment. The lack of proper hazardous cargo documentation precludes the proper planning for loading the vehicles on strategic sealift (ships). To properly plan the stow planning for ships, hazardous cargo must be known to provide the required hazardous cargo separations.

LESSON: All SEDRE training events must included the complete simulated loading and documentation of ammunition and other hazardous cargo in vehicles. All deployment tasks must be completed in the proper sequence during training to ensure proper procedures are known.

TRAINING IMPLICATIONS: Units must “train to standard” for all deployment events. Complete hazardous cargo loading and documentation procedures must be followed during SEDRE training events.

OBSERVATION (18th Airborne Corps): Vehicles used to transport ammunition are not consistently inspected in a proper manner.

DISCUSSION: Vehicles used to transport ammunition are not always being inspected by the Ammunition Supply Point in accordance with Department of the Army Pamphlet 710-2. The fact that ammunition loading is normally simulated for SEDRE training may influence vehicle inspection procedures.

LESSON: Proper vehicle inspection procedures for transporting ammunition must be practiced to prevent unsafe ammunition movement practices.

TRAINING IMPLICATIONS: Proper vehicle inspection procedures must be known and practiced.

OBSERVATION (18th Airborne Corps): Soldiers participating in SEDRE training events were not aware of the entire scope of the operation.

DISCUSSION: Commanders must make sure that soldiers are kept informed on the overall deployment operation. Many junior officer and enlisted soldiers were found to be unaware of other units participating, duration of the mission, or destination. Morale and overall unit performance is improved when everyone is informed on the mission and is made to feel like an important part of the mission.

LESSON: Keep all personnel informed on the particulars of deployment training exercises.

TRAINING IMPLICATIONS: Practice and discipline is required during each SEDRE training event to ensure that all soldiers are informed on the important element of the deployment or exercise.

OBSERVATION (18th Airborne Corps): Unit Movement Officers are not always observed spending time in unit motor pools, rail loading sites, nor the wheel vehicle marshaling area during preparation of vehicles for deployment.

DISCUSSION: Unit Movement Officers should be available to ensure the proper preparation and loading of unit equipment during SEDRE training events.

LESSON: Unit Movement Officers must make themselves available to manage the vehicle deployment process.

TRAINING IMPLICATIONS: Unit Movement Officers must be made aware of the full scope of their responsibilities during deployment operations. Training should reinforce the impact of delays caused by incomplete deployment information or the improper preparation of vehicles for shipment.

OBSERVATION (18th Airborne Corps): Unit Movement Officers are not always fully trained for deployment operations.

DISCUSSION: Specific Unit Movement Officer (UMO) Training Deficiencies noted were ensuring the accuracy of vehicle dimensional and weight data on the Deployment Equipment List, knowledge of hazardous cargo documentation, and general vehicle preparation for shipment. The majority of the incorrect information on Deployment Equipment Lists was caused by UMOs not selecting the correct index for shipping configuration and not accounting for additional height and weight of secondary loads on cargo vehicles. UMOs often fail to annotate on the Deployment Equipment List which vehicles are carrying hazardous cargo. Proper placarding of vehicles with hazardous cargo was also observed as an occasional problem.

LESSON: Commanders must ensure that Unit Movement Officers receive proper training for their responsibilities.

TRAINING IMPLICATIONS: Training of all aspects of a unit deployment must be made available for Unit Movement Officers. Officers are required by FORSCOM Regulation 55-1 to remain in UMO positions for two years. During this period of time it is likely that a UMO will only experience two unit deployments. This infrequent training dictates that supplemental training be provided.

OBSERVATION (SDDCTEA): Unit Movement Officer (UMO) and Deployment Support Brigade coordination procedures are not fully understood by deploying units.

DISCUSSION: It is often observed that UMOs do not fully understand the DSBs role in the deployment process. DSB personnel are tasked with the mission of assisting and advising each UMO during the deployment process.

LESSON: DSB leadership must coordinate with the Division Transportation Officer and individual unit commanders and UMOs to ensure that deploying units understand the role of the DSB.

TRAINING IMPLICATIONS: Proper working relationships between the UMO and DSB personnel must be documented and practiced during all deployment training exercises.

OBSERVATION (SDDCTEA and 18th Airborne Corps): Improper documentation of unit equipment entered into automated information management systems and military shipping labels.

DISCUSSION: Data entered on military shipping labels and into information management systems do not always reflect accurate dimensional and weight data. This caused information received at the seaport to be inaccurate. When detected, the shipping labels and information database is corrected at the port. Unit Movement Officers are responsible for maintaining accurate Authorized Unit Equipment Lists and updating the lists upon alert notification. The updated listings are known as Deployment Equipment Lists (DEL).

LESSON: An accurate review and update of the OEL is necessary in preparing the DEL prior to shipping unit equipment from the fort to the port.

TRAINING IMPLICATIONS: Training on the proper maintenance of the OEL and preparation of the DEL is important to allow for proper preparation of ship loading plans.

OBSERVATION (18th Airborne Corps): Movement planning during one deployment operation was found to inadequate.

DISCUSSION: Movement planning at the brigade and battalion and lower levels was not adequate. The Deployment Equipment List (DEL) had been completed several weeks before the exercise. Changes during preparation for deployment should be expected. However, when changes to the deployment structure occurred, the proper personnel were not informed to record the changes to the DEL. The inaccurate DEL was used to develop aircraft load plans. When the equipment arrived at the airfield for loading, it was determined that the equipment planned for loading was not available. The load plans had to be corrected based on the equipment at the airfield before loading could begin.

LESSON: The brigade staff should become more involved in the planning for future exercises. Brigade staffs should follow established procedures plan the operation in detail, inspect subordinate units' plans, and conduct walk-through inspections.

TRAINING IMPLICATIONS: All division level staffs must understand the complete sequence and requirements of a deployment operation. This will require repetitive training on the process.

OBSERVATION (18th Airborne Corps): After containers were placed on railcars, the Unit Movement Officers did not place Military Shipping Labels on the containers.

DISCUSSION: During the observation of one exercise, it was noted that eight of 26 containers loaded on railcars for shipment to the seaport did not have Military Shipping Labels. Further, 11 of the containers did not have packing lists affixed to the outside of the containers as required by FORSCOM Regulation 55-1. Upon opening the containers for inspection, it was found that some of the containers did not have packing lists inside the container. The present of un-documented hazardous cargo compounded the error. At the port three of the containers failed structural inspection which required the un-loading of the containers and the loading of approved containers.

LESSON: Containers must be inspected by certified container inspectors for structural integrity prior to loading. To ensure containers are properly shipped, the proper documentation of all containers is of utmost importance.

Appendix B: Initial Pre-deployment Concept Design

Background

The initial design of the pre-deployment training concept has been named SEDRE based on the former live Sealift Emergency Deployment Readiness Exercises initiated after the experiences of Desert Shield/Desert Storm. The SEDRE concept design and storyboard is based on previous analysis completed by Enterprise Management Systems. This updated design should continue to be developed and updated after the transition of the SM21 JLETT to a full operating entity. SEDRE could be used as the initial computer based training application to be built by the organization in support of DOD Joint force training requirements.

SEDRE was designed to provide training on the movement of selected combat forces from home station (fort) to the port of embarkation. Fort to port movement is the first step in the overall force deployment process. SEDRE will provide a training environment with a high degree of fidelity with “real world” deployment requirements. This initial training game was designed for the deployment requirements of the 3rd Infantry Division (Mechanized). Future game development would include additional Joint force deployment roles including those at the United States Transportation Command (USTRANSCOM) and subordinate component commands, Joint Forces Command (JFCOM), the Combatant Commands. Also included would be additional Joint Services, with a focus on adding the Marine Corps, the addition of air deployments, and the movement of Joint forces to their “foxhole” locations. Reception operations in the theater of operations might include both fixed pier and in the stream operations.

Note: The terms “CBT,” “game,” and “SEDRE” have both been used to describe the proposed computer based training program in this document. Additionally, the terms UMO and player are used interchangeably in this document.

SEDRE is designed as a computer based training (CBT) program which incorporates the commercial computer game technology developed over the past thirty years. There are currently no other games that provide the level of training to be designed into SEDRE. The initial game will be based on the deployment requirements defined in the 3d Infantry Division (Mechanized) and Fort Stewart Basic Deployment Operations Plans. The units in SEDRE will represent battalion and smaller sized elements (Force Enhancement Modules). The prototype game training objectives will focus on the training requirements for Unit Movement Officers associated with battalion level deployments (company and battalion Unit Movement Officers).

SEDRE is a time-based game. Unlike turn-based games which allow a player unlimited time to make a decision; SEDRE will require the player to make a decision in a “time-pressure” environment. Timing constraints will define response time requirements for the player and his environment.

SEDRE Concept of Operations

The 3rd Infantry Division (Mechanized) deploys the armored forces during contingency operations. To perform this important deployment mission, the 3rd Infantry Division developed a detailed deployment plan that guides the unit deployment from its motor pools to either the aerial port of embarkation (APOE) or seaport of embarkation (SPOE). The deployment plan is documented in the 3rd Infantry Division (Mechanized) and Fort Stewart Regulations and deployment plans, which were employed as the basic guides to develop this design.

The basic building block of the 3D ID deployment operations is the Division Ready Force (DRF). These packages reflect the space on a single Fast Sealift Ship (FSS) (one DRF per FSS). The SEDRE game play will center around one Division Ready Force loading on one Strategic sealift ship.

The SEDRE game play will begin with the preparation for assuming the DRF responsibilities (only transportation pre-assumption requirements will be played). Pre-assumption activities will culminate in the assumption of DRF duties. The deployment scenario will be initiated after the successful completion of pre-assumption activities.

The SEDRE deployment process will begin with the unit equipment in the motor pool and will end after all equipment is loaded into the assigned strategic transport at the Port of Savannah. However, unit movement will be calculated by the game to the theater seaport of debarkation. This will allow the player to see what impact he has had on the overall fort to foxhole deployment process.

At the beginning of the game, the player will be provided the options of "playing" a deployment scenario, reviewing a fort to port deployment process, or researching information in the game reference library. In short, the user can elect to play a deployment scenario or use the game as a self-paced learning and reference tool. The options will be more fully discussion later in this document.

The game is designed to show Unit Movement Officers the positive and negative impact of their decisions in directing the deployment process of their unit. The time-space relationship will be condensed to show the impact of unit level decisions on the overall deployment times. If a UMO fails to ensure his equipment is ready for transport, the impact of the discrepancies, no matter where they impact, will be provided to the UMO (player). An example would be an inaccurate Deployment Equipment List that delays preparation for ship loading at the Port of Savannah.

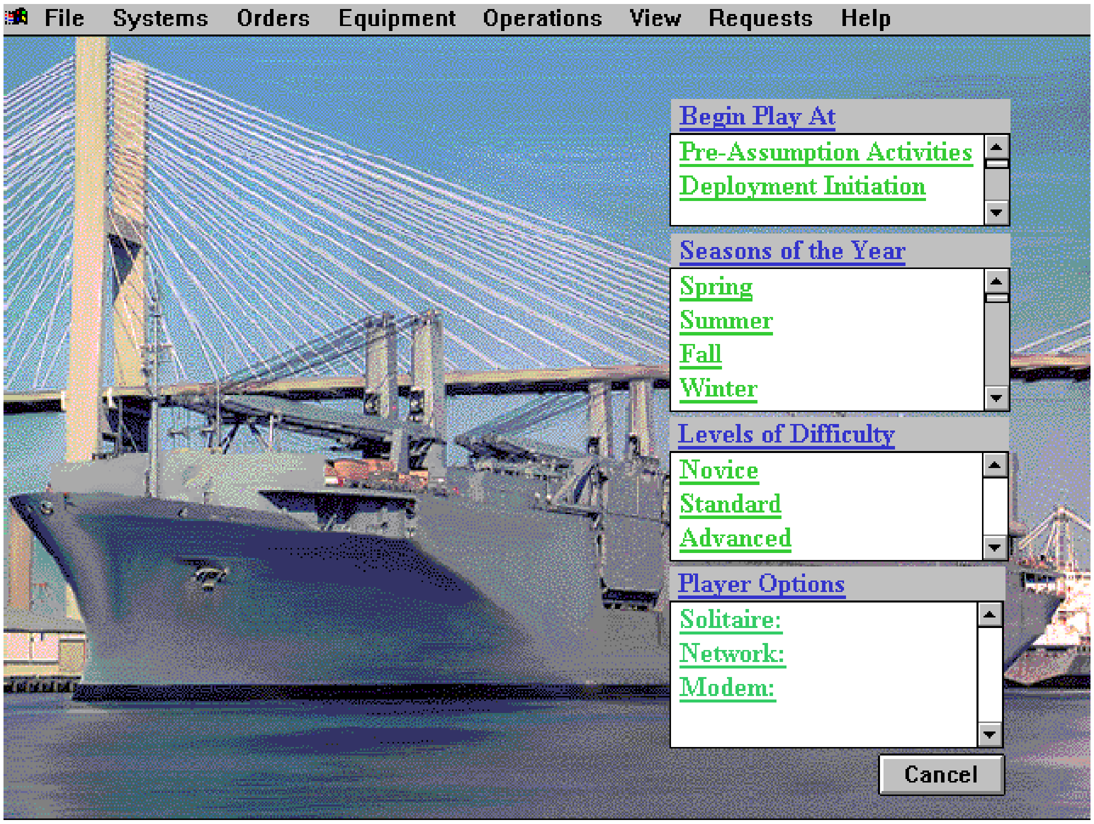
In the advanced difficulty levels, SEDRE will incorporate randomly generated event times and unexpected disruptions to the deployment process. These random events will provide the player with the same possible experiences in the game that he could expect to encounter in the real world. Every time the game is played, different situations and event times will be encountered.

Because of the high cost of live exercises, it is unlikely that Unit Movement Officers will encounter more than two deployments while assigned to the 3rd Infantry Division. Using the SEDRE game, the UMO can be provided with many random deployment experiences.

Game Parameters

After the introductory screens, the user is provided a SCENARIO SELECTION window. In the SCENARIO SELECTION window, the player is given several options. The screen capture below is an initial concept for a SCENARIO SELECTION screen. The first scenario button (DRF/SA) is for a deployment of the Division Ready Force (Sealift). The second button (TAT/AWR3) is for a To-Accompany-Troops only deployment were the unit is "married up" with the Army War Reserve-3 set prepositioned on a strategic sealift ship or it could be equipment sets in a combat area like is the current case in Iraq or Afghanistan. The third button (DEPEX) allows the player to view a Deployment Exercise for the 3rd Infantry Division. The fourth button (References) allows the player to access the on-line references. It should be remembered that these are early concept "idea" storyboards that must be redone prior to the final system design.

The following are the game parameters that can be selected when the player selects the To-Accompany-Troops deployment option or the DRF Sail Away option. The optional parameters include the point of play entry, difficulty level, season of the year, and player option. It should be noted that the only player option available in the first game will be the solitaire option. The screen capture below depicts the game parameters that can be selected by the player.



Begin Play At

The player will have the option of selecting to play the DRF pre-assumption activities or begin with the deployment initiation. All deployments will be "no-notice" deployments. This means that there will be no X-Hour pre-deployment activities. The game will begin with the N-Hour sequence as defined in 3rd Infantry Division and Fort Stewart, *Deployment Plan.*

Season of the Year

The player will have the option of selecting the season of the year for game play. The game will be programmed to provide the weather effects of each season.

- Spring: Impact of rain on roll-on/roll-off ship loading operations, and the impact of light to moderate winds on lift-on/lift-off operations
- Summer: Impact of high humidity and heat on human performance and thunderstorms
- Fall: Rain, wind, and hurricanes
- Winter: Impact of cold on human performance and occurrences of icing

Difficulty Level

The difficulty level can be set to make deployments from the fort-to-port easier or harder. The game is made more challenging through the introduction of random events relating to the deployment process.

There will be three levels of difficulty:

- Novice
- Standard
- Advanced

In the novice level there are no changes to the deployment process by higher headquarters and random transport interruptions are not introduced after initiating game play. The player is also provided prompts and tutorial on screen to assist him during game play.

The standard level introduces random deployment events relating to equipment, transportation, and mission. Random weather conditions will be introduced based on the season of the year selected.

The advanced level will introduce significant mission changes, random events, and "disasters" relating to weather, equipment, support, and transportation.

A comment on disasters: In SEDRE, as in real life, random events and "disasters" occur. SEDRE will present icing, hurricanes, and major infrastructure failures to overcome. Random events will only present themselves in the standard and advanced difficulty levels using a statistically correct occurrence probability.

Players

There are several options to be selected for game play. The current game design is focused on company and battalion Unit Movement Officers. However, the game will be structured to allow for future inclusion of play for the Installation Transportation Officer, and other support level personnel/organizations that are stakeholders in the fort-to-port deployment process. The training application will be scalable to enable in the end a full end-to-end, multi-role, Joint force deployment training application built within a Service Oriented Architecture.

There are also three player options available in the current design concept.

- **Solitaire:** Human player versus the computer. This could be the first deployment wave of the initial game. However, in this option two players could collaborate on the game using the "hot seat" method.
- **Network:** Human player collaborating with other human players over a local network.
- **Modem:** Human player collaborating with other human players over the internet.

Using the above options, future development would allow a game to be played with all the Unit Movement Officers involved with a Division Ready Force playing with the Installation Transportation Officer, and other supporting organizations.

Screen Layouts

Scenario Selection Screen

This screen is used to provide the player with the ability to make game scenario choices. A selection at this screen will cause additional “wrapper” screens to be displayed when the To-Accompany-Troops (Army War Reserve-3 Deployment) or the Division Ready Force (Sealift) options are selected. This screen includes the artwork of a Large, Medium Speed Roll-on/Roll-off (LMSR) ship at the Port of Savannah. Additionally, to provide visual interest, a series of vehicles will be displayed moving to a staging location on the pier area adjacent to the ship. A series of four buttons will be visible to the player. The buttons offer the following choices: To-Accompany-Troops (Army War Reserve 3) Deployment, Division Ready Force (Sealift) Deployment, Fort-to-Port Deployment Overview, and References.

The Fort to Port Deployment Overview option will provide the user with a review of the 3rd Infantry Division deployment process. The Reference button will provide the user access to reference manuals and regulations. The Military Surface Deployment and Distribution Command - Transportation Engineering Agency (SDDC-TEA) Deployment Pamphlets and Deployment Planning Guides will be made available for reference along with Service and Joint Deployment Regulations. These same procedures and references will be available through the HELP Menu. The final selection of reference manuals to be placed in the HELP Menu must be made during development of the final design.

Scenario Parameters Screen

This screen will list all of the scenario parameter choices for the deployment mission selected. These choices include the selection of where play will begin, the season of the year, the levels of game difficulty, and the player options. If fort to foxhole deployments are added in the future a Scenario Editor option would be added. The Scenario Editor would allow the development of scenarios relating to movement of forces from the Port of Debarkation to the foxhole. The artwork in this screen will only serve as a backdrop. Text information will display the available choices to the player.

Multiple Player Configurations

This option will allow the player to set the configuration for multiple-player games. As mentioned above for the prototype game development the only player option will be the solitaire option. It is assumed that using applications like DirectPlay API (used only as an example) that differences between modem and local area network (LAN) play will be transparent to the game software, so both options will be available along with multiple player hot seat. When the multiple player option is selected, a new screen will appear for establishing communication parameters for the modem and network parameters for the Local Area Network (LAN). These parameters will normally only be set once. The player would also designate which multi-player method is desired for this scenario (modem, LAN, or hot seat).

Core Game Screen

This screen depicts a fictional division level emergency operations center (EOC). Across the top half of the screen is three separate “high tech” computer display screens. The right and left screens will be used to provide player information and the center screen will be primarily used for digital video briefings. The foreground screen will be senior officers observing the display screens.

The actual game play will begin here. The idea is to provide as much information as possible on this core game screen. A standard windows menu will be available across the top of the screen, and pop-up windows will appear randomly on the screen to display game messages, provide player information, or ask the player deployment related questions.

On this screen the player will be given an introductory briefing using digital video technology. The initial game "briefing" will be centered on the initial deployment briefing. The center screen will be used for the digital briefings while the right and left screens will provide information in briefing chart format. However, all three "screens" could be used for digital briefings. The idea is to simulate a video-teleconference environment.

Upon the completion of the introductory briefing, a map of the 3rd Infantry Division Deployment Area will be displayed across all three screens. "Hot spots" will be provided to allow the player to move from the core game screen to all key deployment nodes. A pop-up window will ask the player if he is ready to return to his "office" location to begin preparation for deployment. The player can return to the core game screen at any time to obtain the current overall deployment status. The status of the deploying force will be tracked to the Port of Debarkation in the Joint Operational Area. This will serve to tie the operation to the "war."

Other core game screens will include all primary deployment nodes on Fort Stewart and the Port of Savannah. The nodes include the deploying unit "generic" motor pool view, the UMO's "office," the Fort Stewart Rail and Wheeled Vehicle Marshaling Areas, and the Hunter Army Airfield Nose Dock. Additionally, the key nodes on the Port of Savannah will include the rail off-loading points, the wheeled vehicle marshaling areas, ship operations area, and the SDDC Transportation Battalion Control Center.

The Menus

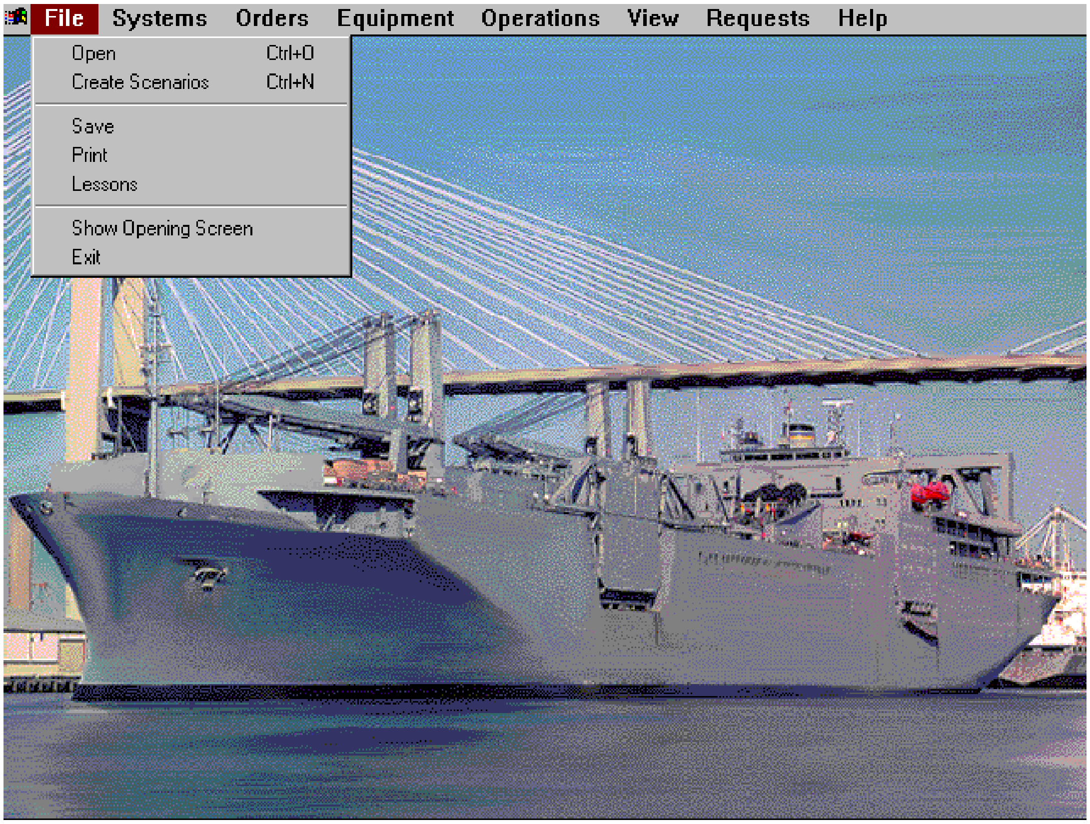
A menu bar will be made available across the top of the Core Game Screens. The menu will have the following choices as depicted below.

File Menu

As depicted below the File Menu allows the player to:

1. **Open** previously saved games
2. **Create Scenarios**
3. **Save** the current game for continued play at a later time
4. **Print** the current screen or an entire reference
5. **Lessons.** This option would allow the player to open lessons developed by a trainer. The prepared lesson would populate the game database with questions and random events to stress specific learning objectives
6. **Show Opening Screen.** This allows the player to return to the opening screen

7. **Exit** the game

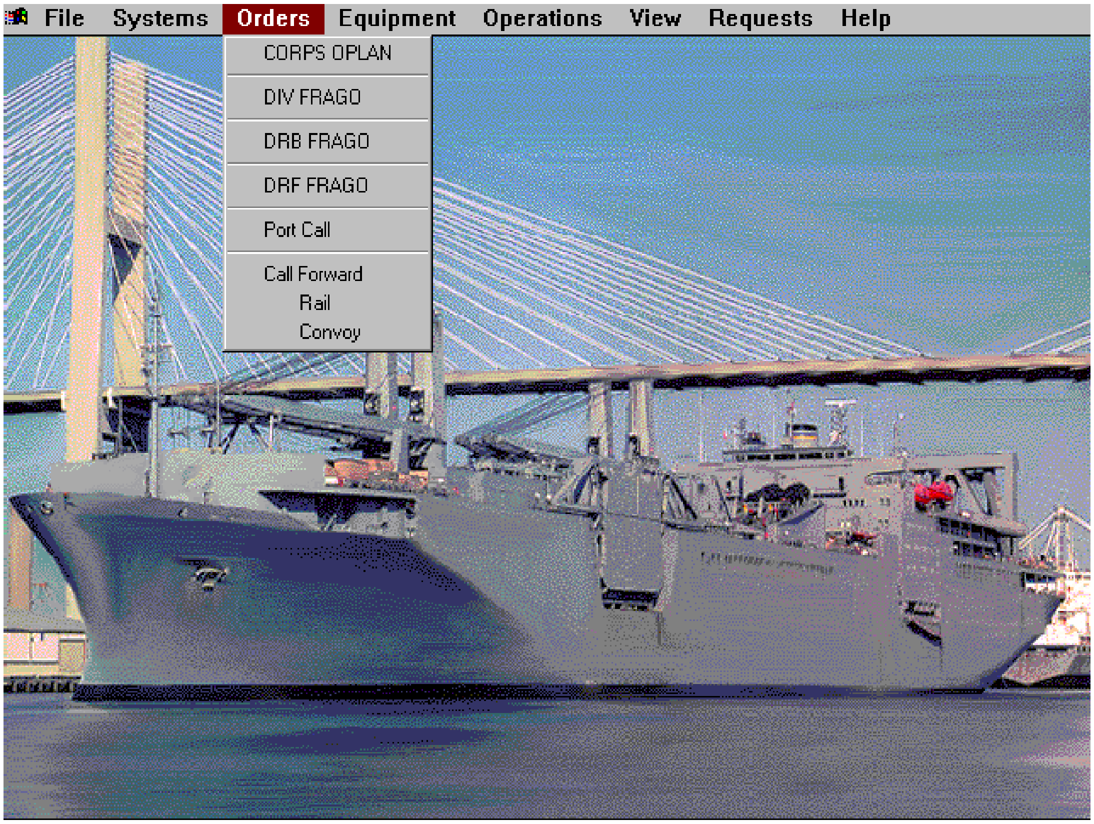


Systems Menu

The Systems Menu allows the player access to the deployment support systems. Currently listed are only two systems for example purposes: TC-AIMS II and the Automated Battle Book (ABS) Systems. TC-AIMS II is to be used to review and update the Organizational Equipment Lists (OEL) and develop the Deployable Equipment Lists (DEL). ABS is needed for determining what the unit needs to deploy with when they are required to use the War Reserve equipment prepositioned on strategic sealift ships or per-positioned within the operational area.

Orders

As depicted below, the Orders menu allows the player to access all of the orders and Unit Movement Plans associated with the deployment.



Equipment Menu

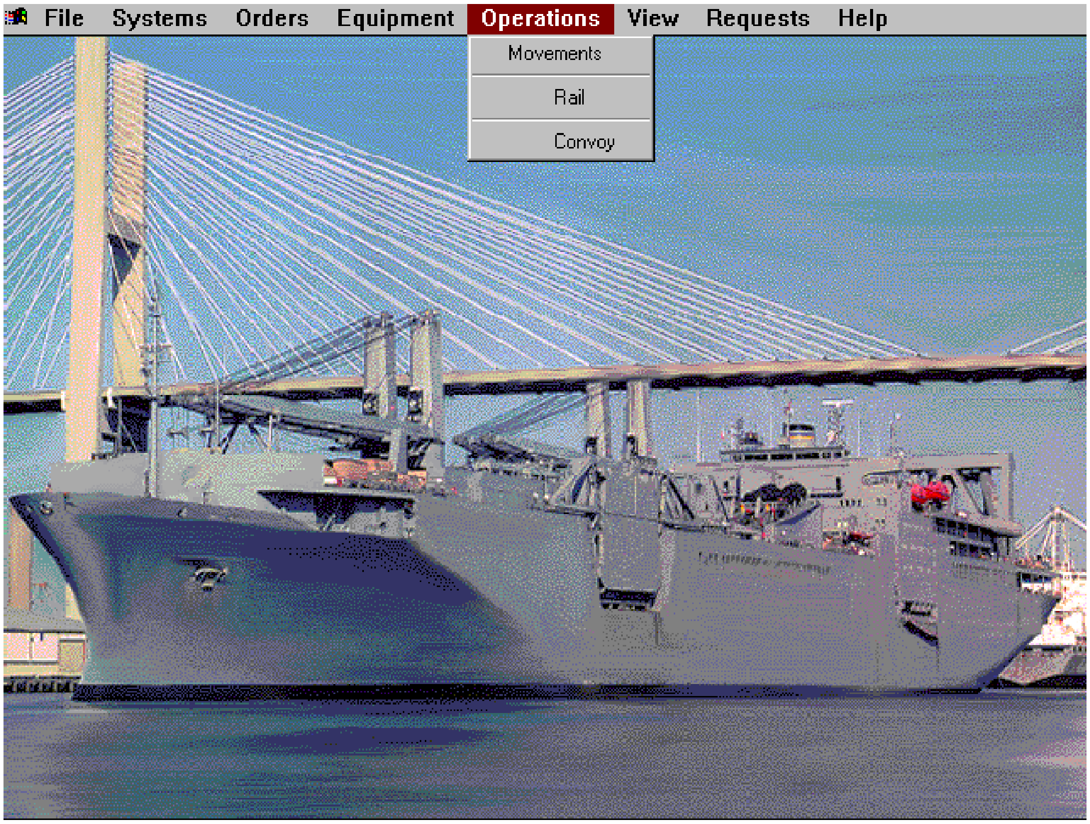
The Equipment Menu allows the player to access the equipment characteristics file contained in TB 55-46-1. This Technical Bulletin will provide the player will all of the equipment characteristics he will need to play the game.

The Status selection opens a file of the DA Forms 2404 associated with the unit's deployment. The file will contain a search option to allow for faster access to a specific vehicle's DA Form 2404.

The Containers selection will allow the player to obtain the status and location of containers assigned to each unit deploying

Operations

The Movements selection provides the options to select rail or convoy movements. The selection of either rail or convoy will open a form for segregating unit equipment into the appropriate modes of transport for deployment. The form will also establish convoy movement units for processing equipment to the rail and convoy staging areas. While not currently depicted, the final design will include line-haul movements and container marshalling movements.

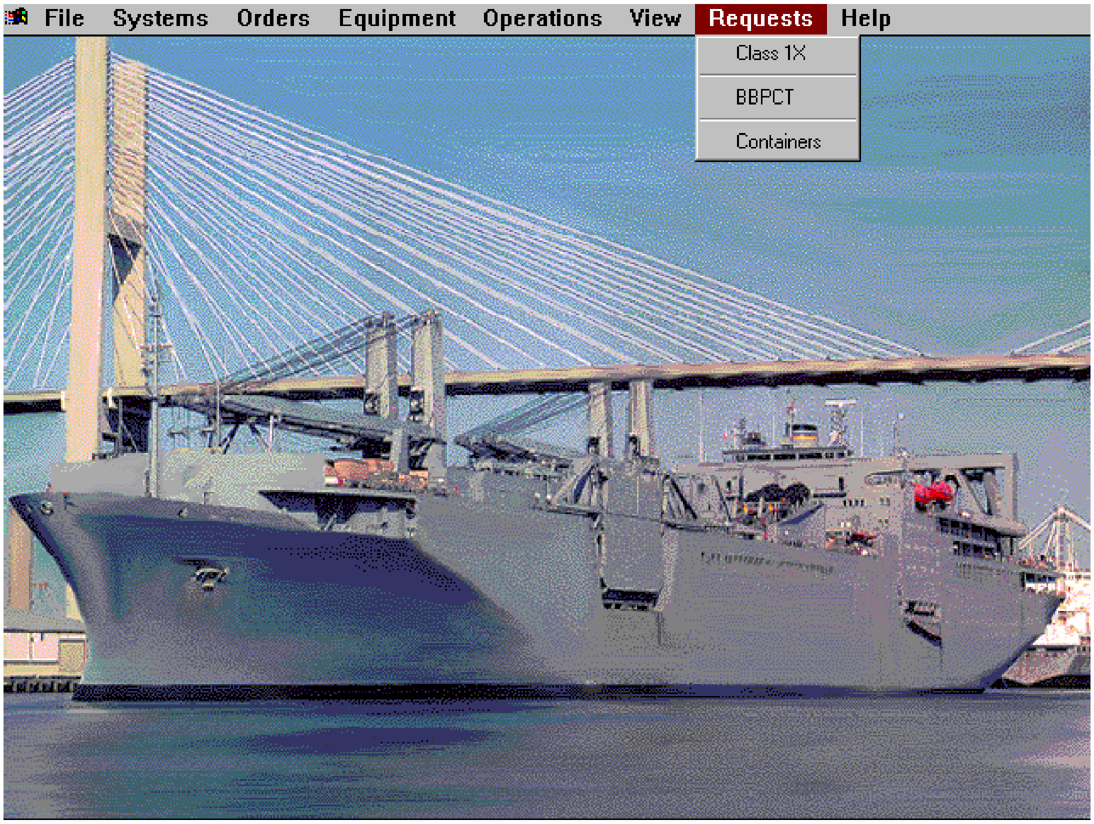


View

This menu selection will allow the player to move between game screens. The final determination on the number and screens to be listed in this option will be determined during the final concept design process.

Requests Menu

This menu option will allow the player to request required Class IX items (determined during the review of the DA Form 2402), blocking, bracing, packing, and crating material (BBPCT), and required additional containers.



Help

The Help Menu provides the player with most of the references he will need to play the game.

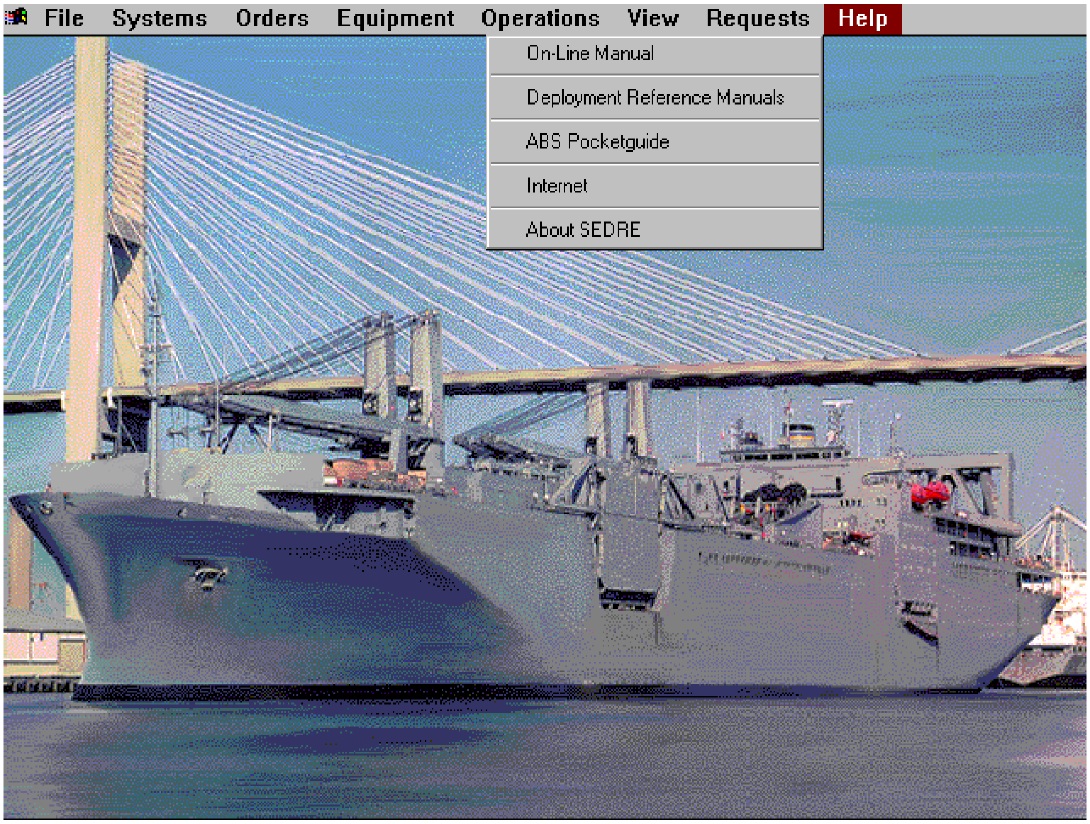
An **on-line manual** will be provided for instruction on game play.

The **deployment reference guides** selection allows the user to access SDDCTEA Reference Pamphlets and Deployment Guides.

The **ABS Pocket Guide** selection will provide the user the help information needed to properly use the Automated Battlebook System. Other system user manuals will be included in the final design as appropriate.

The **Internet** selection will allow the player to access Internet sites related to strategic deployment.

The **about SEDRE** selection provides basic information about the game.



Pop-Up Windows

What's the Current Status?

Pop-up windows play an important role in keeping the player informed on the deployment status. The pop-up window will provide a division level summary of how the player is performing and what types of problems the soldiers are experiencing in preparing the unit for deployment. Unit morale will be tracked using the pop-up windows.

To close the deployment status pop-up window, the player would click the close box (X) in the upper right hand corner of the box.

Handling Random Events

In the course of real world deployments, random events effect even the most efficiently executed deployment. To provide only a sequential series of events without unexpected interruptions would teach the wrong lesson. In SEDRE random events can occur during any phase of the operation. This includes a standard distribution of vehicle preparation times, transit times, and node transfer times. Random disasters can occur including infrastructure failures, adverse weather, transport failures and accidents.

Players can cause the occurrence of "unexpected" events by not properly following established safety procedures. Improperly documented ammunition loads could result in the explosion of a vehicle. Depending on the location of the vehicle, the explosion could have disastrous implications.

The player will need to be prepared to "work around" the disasters by applying common sense and established, standard practices.

Acronym List

3D ID	3rd Infantry Division
AAR	After Action Reports
ABS	Automated Battle Book System
AKMS	Advanced Knowledge Management System
APOE	Aerial Port of Embarkation
ASMP	Army Strategic mobility Program
BBPCT	Blocking, Bracing, Packing, and Crating material
CASE	Computer-Aided Software Engineering
CBT	Computer Based Training
CENTCOM	Central Command
CD-ROMS	Computer Disk – Read Only Memory
CJCSI	Chairman of the Joint Chiefs of Staff Instruction
CODES	Computerized Deployment Systems
CONUS	Continental United States
DACG	Departure Airfield Control Group
DEL	Deployment Equipment List
DoD	Department of Defense
DRF	Division Ready Force
EOC	Emergency Operations Center
FSS	Fast Sealift Ship
FTN	Force Tracking Number
GTMS	Global Transportation Management System
GWOT	Global War on Terror
IDA	Institute for Defense Analysis
IDEF0	Integration Definition for Function Modeling
JDEIS	Joint Doctrine Electronic Information System
JDPO	Joint Deployment Process Owner
JDTC	Joint Deployment Training Center
JFCOM	Joint Forces Command
JLETES	Joint Logistics Education, Training and Exercise Study
JLETT	Joint Logistics Education and Training Experimentation Testbed
JOPES	Joint Operation Planning and Execution System
JROCM	Joint Requirements Oversight Council's Memorandum
JRSOI	Joint Reception, Staging, Onward Movement and Integration
LAN	Local Area Network
LL	Lesson Learned
LMSR	Large, Medium Speed Roll-on/Roll off
MSL	Military Shipping labels
MTMCTEA	Military Traffic Management Command, Transportation Engineering Agency
NAVSEA	Naval Sea Systems Command
ODS	Operation Desert Shield
OEL	Organizational Equipment List
OIF	Operation IRAQI Freedom

POE	Seaport of Embarkation
POI	Programs of Instruction
PSA	Port Support Activities
ROI	Returns on Investment
RFF/RFC	Request for Forces/Request for Capability
RO/RO	Roll-on/Roll-off
SDDC	Surface Deployment and Distribution command
SEDRE	Sealift Emergency Deployment Readiness Exercise
SM21	Strategic Mobility 21
SOA	Service Oriented Architectures]
SPOD	Seaport of Debarkation
SPOE	Seaport of Embarkation
SwRI	Southwest Research Institute
TEA	Transportation Engineering Agency
TTU	Transportation Terminal Unit
UJTL	Universal Joint Task List
USAF	United States Air force
UMOs	Unit Movement Officer
USJFCOM	United States Joint Force Command
USNS	United States Naval Ship
USTRANSCOM	United States Transportation Command

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